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BRAITHWAITE'S RETROSPECT.

VOL. XXI. JANUARY—JUNE. 1850.

THE

RETROSPECT OF MEDICINE:

BEING

A HALF-YEARLY JOURNAL,

CONTAINING A RETROSPECTIVE VIEW OF EVERY DISCOVERY AND PRACTICAL IMPROVEMENT IN THE MEDICAL SCIENCES.

EDITED BY

W. BRAITHWAITE,

LECTURER ON OBSTETRIC MEDICINE AT THE LEEDS SCHOOL OF MEDICINE, ETC.

VOL. XXI. JANUARY—JUNE.

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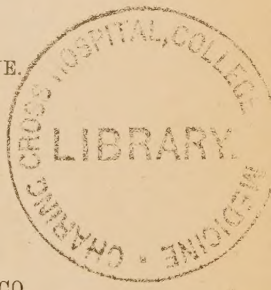

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SYNOPSIS.—INDEX.

[As formulæ frequently occur in this work, in which mention is made of French weights and measures, a table is here given of the value of those denominations which most frequently occur in pharmacy.]

FRENCH MEASURES.

Millitre	=	16.3 min. Brit. Apoth. Meas.
Centilitre	=	2.705 fl. drs. Do.
Decilitre	=	3.381 fl. oz. Do.
Litre	=	1.7608 Imp. Pint.

FRENCH WEIGHTS.

Milligramme	=	.0154 grs. English Troy.
Centigramme	=	.1543 grs. Do.
Decigramme	=	1.5434 grs. Do.
Gramme	=	15.4340 grs. Do.

PRACTICAL MEDICINE,

&c., &c.

DISEASES AFFECTING THE SYSTEM GENERALLY.

Art. 1.—ON THE PATHOLOGY OF SIMPLE, CANCEROUS, AND TUBERCULAR EXUDATIONS.

By Prof. Bennett, Edinburgh.

[Dr. Bennett, in a most valuable paper in the Edinburgh Monthly Journal, describes the three varieties of "exudation," *simple*, *cancerous*, and *tubercular*, as occasioning the great majority of diseases; and directs attention to a knowledge of these as constituting "the foundation of modern rational medicine." He says,]

The term exudation has been introduced into pathology, not only to express the act of the liquor sanguinis passing through the vascular walls, but to denominate the fibrinous portion of the liquor sanguinis itself, when it has coagulated on the surface, or in the substance of any tissue or organ of the body. This term meets a difficulty which morbid anatomists have long experienced; and hence it has of late years been extensively used to signify various kinds of morbid deposits. Thus it has been applied to all those processes hitherto termed inflammatory, tubercular, and cancerous; to all kinds of tumour and morbid growth, and what has been called melanosis and typhous deposit. It is often the cause of many concretions, and frequently constitutes the soil for parasitic vegetations or cryptogamic plants of a low type, which communicate essential characters to certain diseases. Indeed exudation, as a morbid process, comprises the greater part of organic, as distinguished from functional diseases, of lesions of nutrition, as separated from lesions of innervation.

I. Early Phenomena of Exudation.—Exudation in every case results from a previous series of changes which has taken place in the capillary vessels and blood contained in them. These changes, as we are enabled to follow them in the transparent parts of animals under the microscope, are seen to occur in the following order:—1st, The capillary vessels are narrowed, and the blood flows through them with greater rapidity. 2d, The same vessels become enlarged, and the current of blood is slower, although even. 3d, The flow of blood becomes irregular. 4th, All motion of the blood ceases, and the vessel appears fully distend-

ed. 5th and lastly, The liquor sanguinis is exuded through the walls of the vessel, sometimes accompanied by extravasation of blood corpuscles, owing to rupture of the capillaries.

The first step in the process, viz., narrowing of the capillaries, is readily demonstrated on the application of acetic acid to the web of the frog's foot. If the acid be weak, the capillary contraction occurs more slowly and gradually. If it be very concentrated, the phenomenon is not observed, or it passes so quickly into complete stoppage of blood, as to be imperceptible. Although we cannot see these changes in man under the microscope, certain appearances indicate that the same phenomena occur. The operations of the mind, for instance, as fear and fright, and the application of cold, produce paleness of the skin; an effect which can only arise from contraction of the capillaries, and a diminution of the quantity of blood they contain. In the majority of instances, also, this paleness is succeeded by increased redness, the same result as follows from direct experiment on the web of the frog's foot, constituting the second step of the process. In other cases, the redness may arise primarily from certain mental emotions, or from the application of heat. In either case it depends on the enlargement of the capillaries, and the greater quantity of blood they contain.

The variation in the size of, and amount of blood in, the capillaries, is conjoined with changes in the movement of that fluid. Whilst the vessels are contracted, the blood may be seen to be flowing with increased velocity. After a time the blood flows more and more slowly, without, however, the vessel being obstructed: it then oscillates, that is, moves forwards and backwards, or makes a pause, evidently synchronous with the ventricular diastole of the heart. At length the vessel appears quite distended with yellow corpuscles, and all movement ceases.

Again, these changes in the movement of the blood induce variations in the relation which the blood corpuscles bear to each other, and to the walls of the vessel. In the natural circulation of the frog's foot, the yellow corpuscle may be seen rolling forward in the centre of the tube, whilst on each side a clear space is left, only filled with liquor sanguinis, and a few lymph corpuscles. There are evidently two currents, the centre one very rapid, and that at the sides (in the lymph spaces, as they are called), very slow. The coloured corpuscles are hurried forward in the first, occasionally mixed with some lymph corpuscles. These latter, however, may frequently be seen clinging to the sides of the vessel, or slowly proceeding a short distance down the tube in the lymph space, and then again stopping. Occasionally they get into the central torrent, when they start off with great velocity, and accompany the yellow corpuscles. It has been said that these corpuscles augment in number, accumulate in the lymph spaces, and obstruct the flow of blood. In young frogs, their number is often very great; but then they constitute a normal part of the blood, and in no way impede the circulation. In old frogs, on the other hand, all these, and subsequent changes, may be observed, without the presence of colourless corpuscles. When the capillaries enlarge, however, the central coloured column in the smaller vessels may be seen to enlarge also, and gradually approach the sides of

the tube, thus encroaching on the lymph spaces. The slower the motion of the blood, the closer it comes, until at length the coloured corpuscles come in contact with the sides of the vessel, and are more or less compressed and changed in form. At length the vessel is completely distended with coloured corpuscles, the original form of which can no longer be discovered, and the tube appears to be filled with a homogeneous deep crimson fluid. This is congestion. If the morbid process continue, the vessel may burst, causing hemorrhage, or the serum and liquor sanguinis may transude through its walls, without rupture, into the surrounding texture. This is exudation.

II. Theory of exudation.—It is of the utmost importance in pathological inquiries to separate facts from theories. Our facts may be correct, although the conclusions derived from them are wrong. This proposition, however generally admitted, is seldom acted on in medical inquiries, in which we find fact and hypothesis so mingled together, that it often requires considerable critical and analytical power to separate one from another. We are, however, in all cases, insensibly led to theorise—that is, to attempt an explanation of the phenomena observed, in order that we may derive from them some general principle for our guidance. Such speculation is always legitimate, so long as we consider opinions to be mere generalizations of known facts, and are ready to abandon them the moment other facts point them out to be erroneous. The phenomena of exudation, previously described, may easily be demonstrated—they constitute the *facts*. Let us now examine how they have been attempted to be explained—in other words, what is the *theory*.

1. The contraction and dilatation of the capillaries is explicable, by supposing them to be endowed with a power of contractility analogous to that existing in non-voluntary muscles. John Hunter thought they were muscular, from the results of his observations and experiments; and they may be shown by the histologist to consist of a delicate membrane, in which permanent nuclei are imbedded. In structure, then, they closely resemble the muscular fibres of the intestine, and we know that, like them, they may be contracted or dilated by emotions of the mind, or by local applications. The narrowing of these tubes, therefore, may be considered, as Cullen thought it was, analogous to spasm, while their dilatation is similar either to the relaxation which follows such spasm, or to muscular paralysis.

2. The rapid and slow movement of the blood is explicable on the hydraulic principle, that when a certain quantity of fluid is driven forward with a certain force through a tube, and the tube is narrowed or widened, while the propelling force remains the same, the fluid must necessarily flow quicker in the first case and slower in the second. It has been supposed, from the throbbing of large vessels leading to congested parts, that they pump a larger quantity of blood than usual into them. This was called "determination of blood," by the older pathologists, but is now known not to be a cause, but a result, of the changes going on in the capillary vessels. The oscillatory movement, seen in the transparent parts of small animals, has not been seen to exist in man, and probably depends, in the former, on a weakened power of the heart.

3. It is the stoppage of the blood, and exudation of the liquor

sanguinis, however, which it is most difficult to explain ; for why, so long as there is no mechanical obstruction (and during this process none has ever been seen) should the circulation through the capillaries of a part cease ? It has been endeavoured, indeed, of late years, to establish a mechanical obstruction, by supposing the formation of colourless corpuscles, in large numbers, which cling to the sides of the capillaries, and so cause interruption of the stream. But this hypothesis is negatived by the following facts :—1st, In young frogs the vessels may be seen to be crowded with colourless corpuscles, while the circulation is in no way affected. 2d, In old frogs, oscillation and gradual stoppage of the stream may be seen, without any colourless corpuscles being present. 2d, The colourless corpuscles, as shown by Remak, are increased, after large venesections, in the horse, without ever causing active congestion. And 4th, Cases have occurred in man, where all the vessels have been crowded with colourless corpuscles, associated with hypertrophied liver and spleen, and yet no active congestion in these vessels, nor exudation of any kind, has been occasioned.

We cannot ascribe the stoppage of the circulation in the capillaries to venous obstruction, or to mechanical pressure of any kind, because all observation proves that such causes, while they induce effusion of serum, never occasion exudation of liquor sanguinis. We are compelled, therefore, to ascribe the vital force producing these changes, not to anything residing in the blood, or in the vessels, but to the tissues which lie outside the vessels. Whether we give to this force the name of attraction, or whether we consider it a modification of the power which, in a state of health, attracts nutritive materials from the blood, is of little consequence—such seems to be the only active agency to which we can ascribe the approach of the coloured particles to the capillary walls, and the passage through them of the exudation.

III. Resulting Phenomena of Exudation.—When the liquor sanguinis is exuded, it generally coagulates, and constitutes a foreign body in the texture of the parts affected, which it becomes the object of nature either to remove from the system, or so to modify that its presence may be rendered conducive to the wants of the economy. In order to accomplish this, two kinds of changes may take place—1st, The exudation serves as a blastema, in which new vital structures originate and are developed ; 2d, It exhibits no power of becoming organised, and the exuded matters, together with the textures involved in them, die. In the former case corpuscles spring up in the exudation, which differ in form, size, constitution, and power of further development, and give rise to those various appearances and changes which in some cases have been denominated the result of inflammation, in others various kinds of deposits.

We find that the peculiar constitution of the blood, or the general vital power of the organism, exercises a very powerful influence on the development of the exudation. This has been long recognised by pathologists in certain conditions, denominated respectively diathesis, dyscrasia, or cachexia.

1. *Simple Exudation* presents four principal forms—(*a*) As it occurs on serous membranes, when it exhibits a finely fibrous structure, and has a strong tendency to be developed into molecular fibres ; (*b*) As it

occurs on mucous membranes, or in areolar tissue, when it is generally converted into pus corpuscles ; (*c*) When it occurs in dense parenchymatous organs, such as the brain, where it assumes a granular form, and is associated with numerous compound granular corpuscles ; (*d*) As it is poured out after wounds or injuries, and occurs on granulating sores. In these cases the superficial portion is transformed into pus corpuscles, while that deeper seated is converted, by means of nuclei and cells, into nucleus and cell fibres, which ultimately form the cicatrix.

2. *Cancerous Exudation* presents three principal forms, which are dependent on the relative amount and arrangement of the cells and fibres formed in it. (*a*) The structure is very hard, and is principally formed of fibres (*scirrhus*). (*b*) The structure is soft, containing a copious milky fluid, in which numerous corpuscles swim (*encephaloma*). (*c*) The structure has a fibrous basis, so arranged as to form areolœ or loculi, containing a gelatinous gum or glue-like matter (*colloid cancer*).

(*a*) *Scirrhus* presents to the naked eye a whitish or slightly yellowish tinge ; is dense and hard to the feel, and offers considerable resistance to, and often crunches under, the knife. On making a thin section of the growth, it is seen to be principally composed of filaments, which vary in size, and run in different directions, sometimes forming waved bands, at others an inextricable plexus, among which, however, nucleated cells may be seen to be infiltrated. Occasionally the fibrous structure forms loculi or cysts, enclosing similar cells.

The so-called *cancer-cells* may be round, oval ,caudate, spindle-shaped, oblong, square, heart-shaped, or of various indescribable forms, from pressure on their sides. In size they may vary from the 1-100th to the 1-10th of a millimetre in diameter ; but in scirrhus, they usually measure from the 1-50th to the 1-30th of a millimetre in diameter. The cell wall, when young, is smooth and distended ; when old, it is more or less corrugated and flaccid. Each cell contains at least one nucleus, often two, and sometimes they increase in number from three to nine. Most commonly there is only one, which is round or oval, generally the latter, and contains one or two granules or nucleoli. The nucleus, like the cell itself, varies in size, and may occupy from one-sixth to four-fifths of its volume ; between the nucleus and cell-wall there is a colourless fluid, which, at first transparent, becomes afterwards opalescent, from the presence of molecules and granules. On the addition of water, the cell-wall becomes distended by endosmosis, and is enlarged. When acetic acid is added, the cell-wall is rendered more transparent, and in young cells is entirely dissolved, whilst the nucleus on the other hand, either remains unaffected, or its margin becomes thicker, and its substance more or less contracted.

(*b*) *Encephaloma* also presents a fibrous texture, which, however, is very loose when compared with that of scirrhus. In the denser parts of the growth, indeed, it closely resembles that form of cancer ; but where it is pulpy and broken down, often no traces of fibres, or at most some fragments of them, are visible.

The whitish cut surface is often more or less mottled with a greyish, pinkish, yellowish, or black colour. The two first are owing to

different degrees of vascularity. The reddish spots are owing to extravasations of blood, of greater or less extent; and these, when very large, constitute what has been called by some surgeons *fungus hæmatodes*. The yellowish colour, when it surrounds bloody extravasations, is owing to imbibition of their colouring matter; but when reticulated over the surface, or collected in masses, it is generally dependent on fatty degeneration of the cancerous tissue, and forms the cancer reticulare of Müller. The yellow matter is usually of cheese-like consistence, friable, and often resembles tubercle, for which it has been mistaken. The blackish tinge is owing to black pigment which may be infiltrated among the cancerous elements, and exist within the cells, constituting the malignant melanosis, or melanic cancer of authors.

A small portion of the cream-like fluid, examined with a microscope, always presents a large number of the cancer cells formerly described, which in some specimens of encephaloma reach a higher degree of development than in other forms of cancerous growth. These are mingled with a large number of molecules and granules, compound granular cells, blood corpuscles, and more or less of the fibrous element. The fibrous structure is the same as that in scirrhus, but the filaments are often finer, and always more widely separated; while the pulpy matter and cells contained in the interstices are correspondingly increased. The yellow reticulum is sometimes composed of loose granules and compound granular cells, at others, of granules alone. Not unfrequently it contains nuclei, disintegrated and altered in shape. In some instances the encephaloma is more or less impregnated with irregular masses of mineral matter, and occasionally almost entirely converted into a calcareous substance.

(c) Colloid cancer consists of a fibrous structure so arranged as to form areolæ or loculi, which are filled with a grey or amber coloured glutinous matter, sometimes transparent, at others opalescent or semi-opaque. This matter is occasionally found quite structureless, or exhibits only a finely molecular appearance. Under these circumstances the term *colloid tissue* has been applied to it. At other times numerous nucleated cells, presenting all the characters of cancer cells, in various stages of development, are found in it as a blastema; and we observe that the growth has a tendency to spread. This is colloid cancer, which, when it is formed on a free surface, as on the peritoneum, often presents small grains of a grey colour, resembling coagulated gum-arabic. When collected in masses, they have an irregular nodulated aspect. I have never seen the fibrous structure of colloid contain permanent nuclei, or afford any evidence of being developed from nuclei or cells.

All the three forms of cancer now described are vascular, but in different degrees. Scirrhus is least so, but is still rich in blood vessels. Encephaloma is always very vascular, and often to such a degree, that it readily bleeds during life—(*fungus hæmatodes*). Colloid cancer is also well supplied with vessels, which ramify among the fibrous tissue. I have already stated that these forms pass into each other, and need only remark here, that this is often so gradual in many specimens, as to render their classification with either very difficult. This is especially the case with scirrhus and encephaloma.

3. *Tubercular Exudation* has been spoken of as presenting a miliary, infiltrated, or encysted form ; but these distinctions have no reference to structure, but merely to the extent and age of the exudation. It generally presents a yellowish or dirty-white colour, and varies in consistence from a substance resembling tough cheese to that of cream. Sometimes it is soft at one place, and indurated at another. On section, when tough, it presents a smooth or waxy, and when soft, a slightly granular surface. On pressure it is friable, and may break down into a pulpy matter, but never yields a milky juice.

IV. Pathology of three kinds of Exudation.—We have seen that the liquor sanguinis transudes through the coats of the capillaries, and, coagulating outside the vessels, constitutes an exudation more or less solid. Much of the serum which accompanied it is rapidly absorbed, but what remains constitutes a blastema, which becomes, as has been described, organised in various ways, according to the seat and nature of the exuded matter. In simple exudation we observe differences according as it is poured out on a serous, mucous, or granulating surface, or into a dense parenchyma. These differences are certainly owing to the seat of the exudation. But in cancerous or tubercular exudations, we observe no such distinctions, although it has been observed that fibrous cancer or scirrhus is most common in fibrous organs, and cell cancer or encephaloma is most common in cellular organs. The most important characters of the three kinds of exudation may be shortly stated as follows :—

We observe in a simple or inflammatory exudation, that it may occur at all epochs in life ; that it may attack all tissues, and most commonly those which are very vascular ; that it may be poured out in large or small quantities ; and that it may occur with greater or less rapidity—hence the terms acute and chronic. We further observe, that the acute exudations are generally attended with symptoms of a peculiar character (inflammatory), and have a great tendency to cell or temporary formations, which rapidly break down, are absorbed and excreted by the emunctories : that the chronic exudations, on the other hand, have a tendency to fibrous or permanent formations, producing adhesions, strictures, hypertrophies, &c.

We observe, in a cancerous exudation, that it occurs for the most part in persons of adult or advanced life ; that it may also occur in all tissues, but is by far most common in glandular or fatty organs, such as the liver or female mamma, and is very apt to attack the lymphatic glands *secondarily ;* that its progress, although sometimes slow when very fibrous, becomes rapid when corpuscles abound in it ; that there is a great tendency to the formation of most perfect forms of cell life, which have the power of self-development, and thereby spreading to neighbouring tissues ; and lastly, that when, by pressure, ulceration is produced on free surfaces, it bursts through these in exuberant fungoid excrescences.

We observe, in a tubercular exudation, that it occurs for the most part in young subjects, between the periods of dentition and of adult age ; that it may also occur in all tissues, but is by far most common *primarily* in the lymphatic glands, and afterwards in fibrous or albuminous textures, as the lungs and serous surfaces ; that its progress

is generally exceedingly slow ; that there is no tendency to perfect cell formation, but rather to abortive corpuscles, which form slowly, and slowly break down ; that there is little tendency to absorption, but great liability to disintegration and ulceration ; and finally, that the local changes are almost always preceded by derangement of the primæ viæ, and a group of symptoms known under the name of dyspepsia.

Taking, then, the products of simple inflammation (say pus) as a standard, we cannot fail to remark, that whilst the cell development of tubercle is below, that of cancer is above, this standard. Of the three kinds of exudation, tubercle is the lowest, and cancer the highest, in the scale.

On what this difference in the formative power of the exudation depends, we are ignorant, but every kind of reasoning must lead us to the conclusion, that these different changes and effects depend not upon the vascular system, which is the mere apparatus for the production of exudation ; not upon the nervous system, which leads to the necessary arrangement of that apparatus for the purpose ; and not on the texture, which is the seat of the exudation, as that varies, whilst the cancerous or tubercular formation is the same—but in the inherent composition or constitution of the exudation itself. On this point most pathologists are agreed, and hence the supposed existence of various kinds of dyscrasiæ, originating in the blood, which it is imagined explain the different results produced. But here pathologists pause—once traced back to the blood, they are content ; and they have not sufficiently taken into consideration, that the blood itself is dependent for its constitution on the results of the primary digestion in the alimentary canal on the one hand, and the secondary digestion in the tissues on the other. Yet it must be evident to every physiologist, that if it be the constitution of the blood which determines the constitution of the exudation, the causes which produce this must be sought in those circumstances which operate on the composition of the former fluid.

Now, numerous facts, to which I shall allude on some future occasion, render it probable that while the blood is normal in simple exudation, it contains an excess of nutritive materials in cancerous, and a deficiency of them in tubercular, exudation. These are points, however, which can only be established after examining instances of such exudations in detail. But it must not be forgotten, in the meantime, that as the blood is continually undergoing changes, is receiving and giving off new matters, it can scarcely happen that it remains the same for many hours together. An exudation at one time may be very different from that at another. At one period it may abound in elements which do not exist in it at the next. Hence it may often happen that a concurrence of circumstances is necessary to occasion a certain result. A cancer once formed, may remain local until such a concurrence of events arises, comprising, first, a peculiar constitution of the blood, secondly, the phenomena leading to and producing an exudation, and thirdly, the occurrence of this exudation in some other tissue or organ sufficiently predisposed for the purpose. Hence why the histologist is continually finding all kinds of intermediate formations between the three leading kinds of exudation, and why, even when the

constitution is thoroughly cancerous or tubercular, simple exudations may be poured into tissues as the result of recent wounds or injuries.

The final termination of either kind of exudation may be the same, only each has its peculiarities. We have noticed the tendencies of simple exudation to be transformed into pus or fibres, according to its seat. In the former case, the pus cells break down, and are re-absorbed in a disintegrated and fluid condition into the blood; in the latter, permanent fibrous tissue is produced, constituting chronic adhesions or cicatrices. The cells of a cancerous growth may also degenerate or decay, but this rarely takes place throughout the whole structure. But it is not uncommon to find in certain encephalomatous tumours, yellow matter either in masses or reticulated through its substance—(*Cancer Reticulare of Müller.*) This is generally owing to fatty degeneration of the cancer cells. The fibrous structure of cancer may also increase, and occasionally produce cicatrization. Tubercle possesses no such fibrous stroma, which is almost always vascular. This, indeed, is the reason why a cancerous tumour increases by growth, which tubercle cannot be said to do; the former is vascular, the latter is not: in the one, cells are formed which have the power of re-development, in the other, no re-productive cells are produced. In cancer the morbid matter circulating in the blood (whatever that is), is concentrated or attracted to the cancerous part, and should none afterwards be present, the healthy blood is made subservient to the purpose of nourishing a foreign growth. In tubercle, successive fresh exudations only are made, which, by their accumulation, augment the volume or amount of the morbid product.

All three forms of exudation may be rendered abortive by the animal matter being broken down and absorbed, while the mineral matter remains, constituting a cretaceous or calcareous concretion. This is not unfrequently seen as the result of simple exudation; is rare in cancerous, but very common in tubercular exudation.

During the disintegration of simple, cancerous, and tubercular exudations, the animal matter broken down is again rendered fluid, re-passes into the blood, and then constitutes that excess of fibrine detected by chemists. The amount of this, will, of course, vary according to the amount of the exudation and the activity of the disintegrating process. In the blood this effete matter probably undergoes chemical changes, preparatory to its excretion by the different emunctories, but more especially by the kidneys, in the form of various sediments. The resolution of simple exudation is generally accompanied by the presence of such urinary sediments, which indicate pretty clearly in what way, after it has passed through the phases of development described, it is at length discharged from the body. In the same manner the amount of these sediments frequently points out the extent of absorption going on in cancerous and tubercular exudations.

[Dr. Bennett refers the general treatment of exudation, as founded on these doctrines, to three indications: viz. 1st. To prevent or diminish the extent of an exudation; 2. When it has coagulated, to further its removal from the economy; or, 3. If this cannot be accomplished, to render its products as little injurious to the system as possible.]—*Monthly Journal, Feb.* 1850, *p.* 149.

2.—*New Treatment of Cancer.*—Some curious experiments are now going on under the superintendence of the Medical Society of Paris, and relative to Dr. TANCHOU, who for many years has professed to cure cancer and several other intractable diseases.

On the 8th of March last, Dr. Tanchou presented two patients to the Society, and requested the members to examine them. They did so, but strange to say, no two members could agree as to the real nature of the disease; nor would Dr. Tanchou, himself, undertake to pronounce a diagnosis. He merely affirmed, that they were cases of a "mauvaise nature." However this may be, the Doctor proceeded to treat the patients after his own fashion, and again presented them to the Society on the 6th ult. One of the patients had an open sore on the chin, which some said was cancer, others lupus. The second patient laboured beyond all doubt under open cancer of the mamma, and was, moreover, in a very bad state of health. Dr. Tanchou brought back the first patient cured. As to the second one, the ulcer of the breast was nearly healed; the cancerous diathesis had disappeared, and the patient had become fat. These were incontestible facts, and it may be worth while to relate how such results were obtained, although the worthy practitioner's treatment smells strongly of the charlatan. The treatment of the lupus patient lasted three months and a-half. It consisted in a substantial diet and frequent exercise in the open air. These were aided by a great variety of remedial means; first, tincture of iodine, then Fowler's solution, and then arsenic and iodine alternately. The sore was occasionally washed with tar-water, tincture of iodine, decoction of poppies, &c., and finally cauterized with nitrate of silver, creosote, and iodine. The cicatrix is now sound and healthy-looking.

The treatment of the second case was conducted on the same principles, but only gave rise to considerable amelioration. Even this, however, may be regarded as a progress, inasmuch as the majority of the members of the Society had pronounced both cases absolutely incurable when first submitted to them.—*Med. Times, Nov.* 17, 1849, *p.* 389.

3.—*On a Mode of Cauterizing Cancerous Tumours with Solidified Nitric Acid.*—Dr. RIVALLIE lately communicated to L'Union Medicale, his mode of cauterizing cancerous tumours with *solidified* nitric acid. He proceeds as follows:—Some lint is placed in an earthen vessel, and a certain quantity of nitric acid, in its highest degree of concentration, is gradually dropped upon it. A gelatinous paste is the result, and to this, a shape in keeping with the tissues to be cauterized, is to be given. The caustic mass is then seized with long forceps, and placed upon the part. After a quarter of an hour, or twenty minutes, it is carefully to be taken off, and an eschar, four or five lines in thickness, is thus obtained. There are cases, however, where the caustic may be left for twenty-four hours, when the surgeon wishes to destroy a large encephaloid cancer. The pain is trifling except the skin intervene; and when the caustic is left a long time, there is no pain after the first three or four hours! With large diseased masses, the cauterization should be

repeated every day after the eschar has been carefully removed. When the caustic is applied for a few minutes only, the part should, on its removal, be dressed with lint dipped in a solution of alum. Dr. Rivallié gives a few cases where this method of cauterization was used with success.—*Lancet, Dec.* 1, 1849, *p.* 578.

4.—ON VARIOUS SCROFULOUS INFLAMMATIONS.

By G. M. Humphry, Esq., Surgeon to Addenbrooke's Hospital, Cambridge.

The mucous membranes in various parts of the body are particularly subject to scrofulous inflammation, and that of the palate, nose, and throat, more so than any other. Some children are observed to suffer under continual cold, as their affection is called, with accumulation of mucus in the throat and nose, and a thick nasal voice. They snore a great deal and breathe with some difficulty, keeping the mouth always open. The mucous membrane of the throat and nose is in such cases reddish, swollen, and covered with glairy mucus; perhaps its surface is excoriated, or in the worst cases it may be covered with superficial ulcers. In summer these children get better, but in winter the complaint returns. Sometimes the inflammation extends along the eustachian tube to the tympanum, causing deafness. At others the soft palate becomes affected, the mucous membrane lining it is swollen and ulcerated; the ulceration may be communicated to the bones, and clear away the hard palate and septum nasi, causing sad deformity; or the lining membrane of the alveolar sockets becoming swollen, the teeth drop out without evincing any sign of decay, and the alveoli themselves ulcerate and necrose.

Sometimes the affection commences and is seated chiefly in the mucous membrane of the nose, causing swelling of it with superficial ulceration, or the latter may extend more deeply so as to perforate the septum or destroy the spongy and ethmoid bones. The disease is now and then associated with polypus, that is to say, the chronic inflammation of the schneiderian membrane may lead to a polypose condition of it, but you must be careful not to mistake for a polypus the loose swollen membrane which, in consequence of its inflamed condition, hangs from the spongy bones into the nostril. The lining membrane of the lachrymal sac and canal is likely to become involved, causing obstruction to the tears, and watering of the eye; and unless early attention be paid to this disease, we have to fear the complete occlusion of the canal with the formation of lachrymal abscess and fistula, together with more or less caries of the adjacent bones. I may remark, that the disease of the bones here generally *follows* the inflammation of the mucous membrane, and the suppuration of the lachrymal sac, and may in most instances be prevented by a timely incision and the use of the style.

The mucous membrane of the respiratory apparatus may also be affected, either alone or conjointly with that of the nose and palate. Scrofulous children very often suffer from chronic bronchitis, attended

with cough, "stoppage at the chest," wheezing, and the expectoration of frothy mucus. This goes on for a long time, but has no necessary connection with tubercles; indeed, this affection commonly subsides as the child grows older, and the lungs resume their natural condition. It is well for you to beware of the nature of this scrofulous cough, and its independence of organic disease, otherwise you would be likely to give unnecessary alarm to the parents. It is a very troublesome complaint, and leads sometimes to dilatation of the smaller air tubes, and perhaps occasions permanent dyspnœa, but it is not often fatal. I have not observed that it has any very close connection with the emphysema which occurs in early life.

The scrofulous affection of the *larynx*, which takes place after puberty is a more serious affair. In the early stages it is attended with cough, expectoration, huskiness and weakness in the voice, with inability to speak clearly, these symptoms are most felt early in the morning and in damp weather. In course of time the mucous membrane becomes thickened, indurated and uneven on its surface, giving rise to roughness or hoarseness of the voice, with difficulty of expectoration, stridulous breathing, and liability to choking, also to tenderness of the larynx so that slight pressure upon it causes cough. Numerous minute ulcers form upon the surface of the membrane, or larger ones extend deeply into it and attack the cartilages. This disease is frequently associated with tubercles in the lungs. The local treatment of it consists in the application of astringent solutions,—such as nitrate of silver,— by means of a sponge passed into the throat, or what I think more frequently gives relief, a seton placed near to the larynx.

The tonsils are often enlarged in scrofulous persons, with or without accompanying inflammation of the mucous membrane. The disease seems to consist in a simple hypertrophy of the follicular basis, of which they are composed, without much alteration of structure. Sometimes they contain yellowish white spots, scattered through their substance, which look more as if they proceeded from discolouration of the tissue than from any new deposit into it. The tonsils thus enlarged are painless, and do not interfere with deglutition unless they are inflamed, but they alter the voice, and render the patient liable to sore throats, which are lingering and very distressing, sometimes even alarming, from the difficulty of breathing, occasioned by a lodgment of mucus in the narrowed passage of the fauces. On this account we are required to treat them. I have in some cases diligently persevered for months in the application of nitrate of silver and iodine, but I cannot say that the result was very satisfactory. As the child grows up, and more particularly after the period of puberty, they often diminish in size spontaneously; but if they are the cause of much trouble, it is worth while to remove them, which is very easily done with a probe-pointed bistoury and a vulsellum, provided the patient is old enough to exercise a little self-control, and does not resist the operator. In children the operation is very troublesome, and I am unwilling to resort to it on that account, and from the fear of bleeding. I once knew hemorrhage take place to rather an alarming extent after the removal of a tonsil in a young man, but it ceased after a time, when he was kept quiet, with his head raised. In

speaking of the removal of a tonsil—I mean that part of it which projects beyond the level of the pillars of the fauces—a portion of the gland is almost always left behind; and though I have heard the operation objected to on the ground that this remaining fragment is likely to enlarge, and have in consequence watched several cases for a considerable period, I have not known this to take place in any one.

The mucous membrane of the urinary and genital system is also very liable to inflammation in scrofulous persons. When affecting the bladder it forms a very troublesome complaint, giving rise to symptoms resembling those of stone, viz., frequent and painful micturition, the pain being felt over the pubes as well as at the extremity of the penis; sometimes there is incontinence. The urine generally contains a good deal of mucus or pus, and is sometimes tinged with blood; it is not that tenacious, white of egg-like, ropy mucus, adhering to the bottom of the vessel, which we are in the habit of seeing in common catarrhal inflammation of the bladder, but it forms a loose, white, milky sediment, and contains, perhaps, soft white flakes of lymph; it is commonly alkaline, and there may be particles of phosphate or carbonate of lime in it.

If the bladder be examined where such symptoms have existed during life, the mucous membrane is found to be vascular, thickened, soft, and velvety. It may be covered with minute flakes, or an entire coating of lymph. Adhering to the lymph may be seen, as in this specimen, a white powdery substance, composed of carbonate and phosphate of lime. Sometimes the surface of the membrane is rough and excoriated, or the ulceration may have proceeded more deeply, and you may find several small circular ulcers, proceeding from central points of grey deposit, like tubercles, and running together, so as to form larger ulcers; or there may be, as you see in this specimen, a more extensive deposit of soft grey substance in the structure of the mucous membrane, and in the submucous tissue, with ulceration commencing at many points, and forming a large, ragged, dirty surface, resembling much the corresponding disease in the mucous membrane of the palate and in the skin.

Not uncommonly the inflammation is found to have extended along the lining membrane of the ureters up to the kidneys. Here is an instance where the ureter is enlarged nearly to the size of my little finger, and choked up with a soft, yellowish, white substance, so as to leave only a narrow channel down the middle, through which the urine continued to trickle. This condition extends quite up to the kidney, and you observe that the pelvis and calices are also much dilated, their lining membrane swollen, and covered with a soft white secretion, composed probably of diseased epithelial scales, mixed with a substance intermediate between pus and the lymph of scrofulous inflammation. There are also yellowish white spots in the substance of the swollen membrane. Some of these have softened, and their contents have been washed away, leaving small cavities, which look like ulcers. In the substance of the kidney are other spots and cavities, which may be sections of the urinary tubes; diseased in the same manner as the pelvis and calices, or they may result from independent deposits into the glandular structure of the organ. Some of the cavities are of con-

siderable size, having been occasioned no doubt by the coalescence of smaller ones.

Now, a precisely similar disease to that which I have been describing in the urinary tubes and kidneys, is of no uncommon occurrence in the genital tubes and testicle; moreover, the two sets of organs are frequently affected in the same person. The convoluted series of tubes at the two ends of the vasa deferentia, viz., the vesiculæ seminales in the one direction, and the epididymis in the other, are generally attacked first, and the disease extends from them to the adjacent glands, to the prostate from the former, and to the body of the testicle from the latter.

As the disease advances the tubes become more distended, the scrofulous substance contained in them softens into a curdy fluid, with which some pus is intermixed; the lining membranes of the tubes become impregnated with the same substance, deposited in spots, or more generally infiltrated through their tissue. The membranes are in this manner destroyed, and the natural structure of the part is lost by the fusion of the tubes into cavities, which, enlarged by the increasing accumulations in their interior, project from the epididymis into the loose tissue of the scrotum, surround the testicle, and at last burst through the skin, discharging their contents, and leaving sinuses. The sinuses thus made often remain open for months and years, forming channels of communication between the interior of the epididymis and the surface of the body. They discharge a thin fluid, in which spermatozoa may be sometimes found.

You observe that the disease consists not simply in the accumulation of scrofulous substance in the tubes, but that the lining membrane of those tubes also undergoes a change.

Scrofulous disease of the testicle is of common occurrence. Sometimes it occurs as the remnant of acute epididymitis, but more frequently it begins insidiously, and proceeds with little or no pain. A patient applies to you in consequence of enlargement of his testicle, which is attended with some uneasiness in the part, and some aching in the loins. You find the epididymis enlarged, with soft swellings, perhaps, projecting from it; the vas deferens may be also large and knotty. At first you can distinguish that the body of the testicle is healthy, but it subsequently ceases to be so, or it becomes so lost in the swollen epididymis that you can gain no information respecting it. You will not, in such a case, forget to examine the other testicle, the vesiculæ seminales, and the prostate, and to inquire into the condition of the urine and the state of the bladder.

The several cases which have been, and now are, attending at the hospital, have given you reason to know that the scrofulous affection of the urinary and genital system, particularly of the testicle, is by no means more easy to cure than the other forms of scrofula. In some of those cases we have tried a variety of remedies without any apparent advantage. In truth, it is generally accompanied by fewer indications of treatment than most other scrofulous affections, and, though like them, associated with want of vigour of the nutritive functions, it is, I think, less commonly accompanied by the symptoms of disorder of the digestive system. You will find it a rule, with exceptions no doubt,

that the scrofulous cases which are devoid of that accompaniment, are the most difficult to cure, because they are the most directly and completely dependent upon the constitutional defect. The measures most conducive to the general health must be tried, such as simple and nutritious diet, fresh air, and tonic medicines. The application of a solution or ointment of iodine, so as to produce slight irritation of the scrotum, may do some good. The internal administration of iodine and cod-liver oil are also sometimes beneficial. There is no doubt that many of these cases get well as the patients become stronger ; we may, therefore, encourage them with the prospect of a cure, though we are unable by any direct means to contribute very greatly to it.

The prospect of acute inflammation degenerating into this tedious and destructive chronic disease, will make us especially anxious to arrest the disorder quickly when called upon to treat the common "hernia humoralis" in persons of delicate scrofulous habit. We shall be careful that no traces of it are allowed to linger behind, especially as in the debilitated state to which the patient is reduced by an acute attack the organ is often slow to recover its natural condition, and if the antiphlogistic treatment, with confinement to bed, be continued too long, the chronic disorder may not unlikely be engendered.

We are sometimes called upon to consider the question of the removal of the organ. It is seldom imperatively necessary to do this, but when the disease has so destroyed the natural structure of the organ as to render the restoration of its function improbable, it is advisable to remove that which has become a mere burthen and source of annoyance, especially if the patient be confined to bed in consequence of it, and his strength is being weakened by the successive formation and bursting of abscesses, and by the discharge from them. I do not think that the existence of the disease in other parts of the genital system is of itself sufficient to preclude an operation, because in the cases which I have seen, the removal of the one testicle has not been followed by an increase of the disease in the other, but on the contrary the remaining organ has appeared to fare rather better, and to recover more quickly. The experience of one person, however, cannot furnish sufficient data for the decision of such a point as this.

There is one other circumstance which I must mention to you before dismissing this subject of the scrofulous disease of the testicle ; and that is its frequent association with phthisis pulmonalis. This has happened in about one half of the cases I have seen.

In the scrofulous disease of the bladder, especially when the urine is alkaline, small doses of the mineral acids, given in bitter infusions, are often productive of benefit ; also iodine, in the form of the iodide of potassium, and the preparations of steel. It is very important to rectify any disorder of the digestive organs that may accompany it, for all the inflammatory affections of the bladder are much influenced by the state of the stomach, and care in diet must be strictly enforced. If, in spite of these precautions and remedies the disease still lingers, or shows a disposition to increase or spread to other parts, you had better adopt some permanent counter-irritation, such as an open blister, or, still better, a seton above the pubes or in the loins.

The genital organs in the female are also liable to scrofulous inflammation. There may be deposit of lymph and abscess in the ovary, but that is not common. The Fallopian tubes are more frequently the seat of this disease. Here you see a specimen where those tubes are lengthened, contorted, and greatly enlarged. They increase in size towards their free extremities, which were adherent to the surrounding parts. The mucous membrane lining them is much swollen, and of a yellowish-white colour, having undergone the same change as the mucous membranes of the ureters and vasa deferentia in the specimens I just showed you. The tubes also contain some soft scrofulous matter. The uterus itself is healthy, though of small size. Here is another remarkably small uterus taken from a person who was of a scrofulous constitution. This disease of the Fallopian tubes, though existing in a much slighter degree than in the specimens before you, would be likely to occasion sterility.

The scrofulous disease of the *synovial membrane* is the most common cause of white swelling of a joint. In the early stage the membrane is merely thickened, has a somewhat granular appearance, and is semi-opaque, of pale colour, with a brownish or reddish tinge. Soon it is found to be mottled with white spots of various sizes, scattered more or less thickly through it; sometimes they look like mere minute specks, at others they consist of a discoloration of considerable portions of the thickened membrane. As I have before said, these spots seem to depend rather upon a change taking place in the structure of the already diseased membrane than upon any fresh deposit into it. However this may be, they frequently soften into a white curdy fluid, become connected with one another in the same manner as small abscesses do in other parts, and either burst externally or find their way into the cavity of the joint.

I think it is very important the patient should not be confined to bed or to the house, more than is absolutely necessary; for I am quite certain that the local disease is often much aggravated in consequence of the injury to the health occasioned by close confinement. At the same time it is important that the joint should be kept quiet when it is at all tender, painful, or uneasy after exertion. To secure this it is a good plan to fix and support the joint by means of bandages, plasters, and leather or gutta percha splints, while the patient is allowed to go out upon crutches. The tincture or ointment of iodine applied every night and morning, so as to produce some irritation of the skin, but not sufficient to prevent the limb being bandaged during the day, is one of the best local applications. It may be alternated with other stimulating liniments, with blisters, or, in slight cases, with the cold douche. When abscesses form I generally allow them to burst, because their contents are thus discharged more freely and the slight loss of skin occasioned thereby is not very important.

I have tried the cod-liver oil in many of these cases,—in a few with decided advantage, but in many instances it seemed to do no good. I cannot say that I have found iodine administered internally of much service in this disease.

If you have studied the pathology of *tubercles* at all you cannot have failed to remark their close apparent resemblance to those little deposits of ill organised lymph I have been speaking about, which form a prominent feature in scrofulous disease, occasioning so much destruction of tissue, and giving rise to the formation of ulcers, in consequence of the softening and suppuration they have a tendency to undergo. It is probable, I think, that the relation between tubercles and these deposits of scrofulous lymph is not one of mere external resemblance, but that they are in their real nature and essence very closely allied.

A tubercle consists of a small mass of heterogenous substance interstitially placed with regard to the tissues in which it is imbedded. It does not increase to any great size, but it softens and suppurates, destroying at the same time the tissue involved with it, and so forms a cavity. The contents of this cavity, increasing like those of an abscess formed in any other manner, occasion absorption or ulceration of the structures intervening between them and the surface, and are discharged. About the time that the softening commences, inflammation is set up, and lymph effused in the circumference of the tubercle, walling it in, and forming the lining of the cavity. The destructive effects of tubercles depend not upon the ability of each one to attain to a great size, and, like a cancerous growth, to go on spreading at one part while it is softening at another, but upon their disposition to occur in considerable numbers, all of them running the same course, and forming cavities, which coalesce into larger ones, and so make great havoc, sometimes hollowing out, as in this specimen, the entire substance of the lung. An individual tubercle, when it has softened and burst, has done its worst; the cavity left by it is lined with the common lymph of inflammation, which would contract and cicatrize, and there would be an end of the matter, did not other tubercles exist in the neighbourhood undergoing the same changes, bursting into this cavity, and continuing the work which the first had begun.

When I suggest that tubercles are nearly related to the scrofulous deposits which I have described to you in this and the former lectures, I do not mean to intimate that they are dependent entirely upon inflammation, or that they consist of masses of lymph strictly so called, for there is often, indeed commonly, no evidence of their being preceded or accompanied in their first stages by any inflammation; and you remember that according to our definition made on a former occasion, lymph is effused fibrin altered by the inflammatory process; but I mean, that they probably consist of some of the imperfectly elaborated components of the blood, the albumen or the fibrin, changed, it may be, in some manner, and effused among the tissues. These remarks apply also in some measure to the scrofulous deposits, which are often preceded by no signs of inflammation, and which sometimes seem rather to excite than to depend upon that process.

Both in the scrofulous and tuberculous subject, particularly the latter, when genuine acute inflammation is induced, the effused lymph partakes more nearly of its ordinary or healthy characters. Sometimes, however, even then, it has the constitutional defect impressed upon it, giving rise to what is called tuberculous and scrofulous infiltration, which is not

always confined to small spots and masses, but may extend through a considerable space.

The degree in which tubercles differ from the ordinary scrofulous deposits varies according to the constitution and age of the patient. In the young, light complexioned, delicate patient, who presents the signs of the scrofulous diathesis most strongly, the tubercles are from the first large, of yellowish-white colour, and cheesy consistence, closely resembling, in short, the common scrofulous deposits; so closely, that the one can scarcely be distinguished from the other. They are attended with inflammation in an early stage, soften quickly, and run their course in a comparatively short period. In older patients, and in the dark-haired, thin, active persons, who exhibit fewer traces of a scrofulous habit, the tubercles are at first much smaller and harder, forming little semi-opaque horny grains, which easily escape notice; these have been called miliary tubercles. They are slower in their changes, remaining sometimes quiescent, or advancing but little for months. In their progress they increase a little in size, become more opaque, of white or yellowish-white colour, so as to resemble those last described, and then gradually soften and form cavities. These miliary tubercles have been thought to form the early stage of those first mentioned, and so, no doubt, they often do, but the large white tubercles are very frequently found presenting their own distinctive characters from their first commencement in the class of persons I have mentioned.

The softening of tubercles, though generally accompanied by some inflammation and deposition of lymph in their circumference, is in all probability independent of that inflammation, or rather may be regarded as its exciting cause. It seems to depend upon some quality inherent to the tubercles themselves; often it begins in the centre, and forms a cavity there, so that when the tubercle is opened it looks like the divided end of a tube. This appearance has given rise to the mistaken notion entertained by Carswell and some other pathologists, that tubercles of the lungs consist in a concentric deposit within the minute bronchial tubes.

Tubercles, and as I have just said, the small grey miliary tubercles particularly, sometimes fall into a quiescent state, become dry, and the surrounding pulmonary tissue loses its increased vascularity. Even after softening has commenced they sometimes retrograde, drying up, and undergoing calcareous transformation, while the lymph effused into the surrounding pulmonary tissue contracts upon them, and gives rise to a puckered appearance, like a cicatrix. We often find in old persons these traces of the tuberculous disease of early life. Whether they are ever absorbed in the early stages, and disappear entirely, so as to be quite cured, is uncertain, though it is probable that they do so.

The lungs are more frequently the seat of tubercles than any other organ of the body, and the distinctive characters of the morbid product are most clearly marked in them. On the peritoneum also, they are of common occurrence, both the small, hard, grey tubercles, and especially the large, soft, white ones, which have a near resemblance to scrofulous deposit, and which, as I have just intimated, seem to form the connecting link between tubercle and scrofula. In the liver, spleen, and brain,

tubercles are less common, and approximate still more closely to scrofulous masses ; and in the absorbent glands, the skin, and the bones, the deposit which I have described as the result of scrofulous inflammation, is by many pathologists ranked under the head of tubercle.

I do not think that persons who suffer from scrofula are much more liable to tuberculous phthisis than others. This is scarcely to be considered an argument against the supposition of the two diseases being very nearly allied, and is no more remarkable than the fact that each of them is so frequently confined to a particular organ, or a particular class of tissues. Tubercles are often found only in the lungs, and I told you on a former occasion that scrofulous affections are very commonly limited either to the absorbent glands, the skin, or the bones, in individual cases. Even if tubercle and scrofula be *identical*, each deriving its peculiarities from some quality of the organ affected, it is no wonder that the two are not found to co-exist more frequently.

I have already mentioned that the scrofulous disease of the testicle is very often associated with tubercles in the lungs, and I have observed that the same is true of scrofulous abscesses on the thorax connected with disease of the ribs. There are patients at the hospital at the present time whose cases illustrate the truth of this remark. It is also a general impression, and, I think, a well-founded one, that patients who, in early life, were troubled with scrofulous affections, are, after the age of puberty, when the disease of their childhood has passed away, very liable to fall victims to tuberculous disorganisation of one or other of the internal organs.—*Prov. Med. and Surg. Journal, Dec.* 12, 1849, *p.* 673.

5.—Observations respecting Ascites. By Dr. Dubini.—1. When ascites is not the result of a pre-existing, or present, acute or chronic primary peritonitis, it will be found to depend upon hypertrophy with degeneration of the hypochondriacal viscera, the presence of abdominal tumours, a prior or existing dysentery, or upon *cirrhosis* of the liver.

2. In fact, peritonitis depending on these various conditions of the viscera, is almost always the efficient cause of the effusion. In respect to the operation of visceral hypertrophy and abdominal tumours in inducing it, there can be no doubt. In dysentery, with ulceration of the mucous membrane, inflammation of the peritoneal coat is found. In *cirrhosis*, observation would seem to show, that the fluid may collect in consequence of peritonitis, or, on the other hand, mechanically from obstruction of the capillaries of the liver.

3. Post-mortem examinations prove, that defective absorption by the lymphatics, as a cause of dropsy, is a scholastic fable. Atony may follow the distension and destruction of tissues in the dropsical, but it is never, or with exceeding rarity, primary.

4. Ascites must not be confounded with other serous effusions, especially with general anasarca. The common causes of general dropsy, as hydræmia, scarlatina, Bright's disease, suppressed perspiration, &c., are not the direct causes of ascites, which, as already observed, has its own special cause, and seems also to recognise other directly or indirectly

predisposing ones, such as intermittent fevers, abuse of spirituous drinks, and a certain inelastic and relaxed state of the organic tissues.

5. Diseases of the heart, so frequent a cause of anasarca, are never the primary cause of ascites, and if the two are found in co-existence, it is a mere coincidence. A diseased heart may lead to a hypertrophied or degenerated state of the liver, and this may give rise to ascites.

6. In enormous and old ascites, in which long and forcible pressure has been exerted upon the viscera by the fluid, a shortening of the intestinal tube takes place. In one case, the entire length of the canal was not more than three times that of the body.

7. The treatment by means of drastics is prompt, and always much desired by the patient, who wishes to relieve the distension as rapidly as possible. It is rare for them, however, to produce a permanent cure, and the relief they at first afford is often followed by a relapse, under the influence of which the patient quickly finds himself in a worse state than before. If a red, shining, or excoriated tongue indicate a pre-existing diarrhœa, in place of a relapse, drastics will cause irreparable mischief, by provoking a second and artificial diarrhœa, which will only cease with life itself.

8. Diaphoretics, employed in this generally non-febrile disease, are praised in the books : but what practitioner ever prescribed them for apyretic ascites ? Nature alone, in particular cases, contrary to our physiological laws, induces simultaneous profluvia of sweat and urine, until the ascites is totally dispersed. Iodine and mercurial frictions are but therapeutical delusions, although in certain cases, in which the symptoms of peritonitis still exist, calomel may be of service. The frequent failure of diuretics is well known.

9. When even the local abstraction of blood is no longer admissible, and it hence presumable that the peritonitis no longer exists, *compression* of the abdomen by a bandage is a useful aid to diuretics. Like all other means it may be misused, but twelve years' experience of it leads the author to state, that if the dropsy be not encysted, and the lower extremities have not become œdematous, compression will not only in the majority of cases remedy the effect, but frequently also remove the morbid cause of the effusion. In very many cases, he has seen the same diuretics, which had long been uselessly employed, succeed admirably as soon as a methodical compression was conjoined to their use.

10. After recovery, when the ascites has depended upon dysentery or primary chronic peritonitis, a relapse may be prevented by opening an issue, at the inner side of the leg, just below the knee. After the application of a very small blister, a minute ivory ball may be compressed against the denuded surface to effect this.

11. There are certain cases of anasarca, from *hydræmia*, in which the ascites though not primary is very considerable, and threatens suffocation from its rapid increase. In these there is always found a degree of hypertrophy of the liver, a section exhibiting it of a bright yellow colour, and of the consistence of soft chalk. The blood is scarcely red, and very watery. All the symptoms of chlorosis, and some of those of scorbutus are present, as palpitation, syncope, vertigo, tinnitus, muscular debility, pallor of the mucous membranes, anorexia, thirst, constipation, paucity

of urine, and sweating, with frequent attacks of epistaxis. In these cases, the *souffle* heard after the first sound of the heart is rather referable to the serous crasis of the circulating fluid, than to any defect in the circulatory organ. For this train of symptoms the author had long sought medicinal substances, which, while they proved unstimulating diuretics, might remedy the condition of the blood without disposing the organism too much to a state of phlogosis, which, in subjects of hydræmia, always terminates in new effusions, that in their result prove fatal, if they do not so in their immediate consequences. What he terms a "martial lemonade," has best fulfilled by its effects the chief indications, and especially by causing a free diuresis. It is formed by dissolving six grains of *sulphate of iron* in a pound and a half of water sweetened with an ounce of syrup, and adding a drachm of *sulphuric acid*—the period and continuance of its administration, and the dose in which it is given, being regulated by the practitioner, according to the exigencies of the case. Its use is contra-indicated in those cases in which the tongue is red and glazed, or has prominent papillæ, and when a certain amount of febrile action indicates the presence of thoracic inflammation or of hepatic peritonitis.—*Bulletino delle Scienze Mediche —Brit. and For. Medico-Chirurg. Review, April*, 1850, *p.* 536.

6.—*On the respective Value of Lime-Juice, Citric Acid, and Nitrate of Potash, in the Treatment of Scurvy.*—By Dr. Alex. Bryson, R.N. [Instructions were given several years ago to the surgeons of convict ships, that if scurvy broke out during the voyage, they were to try the relative effects of lime-juice, nitrate of potash, and citric acid; choosing similar cases for experiment, and placing the patients under like circumstances of diet and exercise. Dr. Bryson details some results which have been thus obtained. He says,]

In ten vessels, in which the disease made considerable progress, and in which the trials were conducted according to the instructions, the conclusions arrived at were as follow:—The different vessels, for the sake of brevity, may be numbered. In the first the citric acid was considered to be the most effective. The nitre, which appears to have been sometimes combined with lime-juice, although it was also given separately, disagreed with most of the patients, causing irritability of the stomach, and relaxation of the bowels to such a degree, that it was necessary to combine opium with it. In the second, it was supposed there was not much difference between the remedial action of the citric acid and nitre: both were considered to be preferable to the lime-juice. In the third, the citric acid and lime-juice appeared to have the power of arresting the progress of the disease, but not of curing it. The nitre seemed to impair the powers of digestion and assimilation, and was therefore considered to be injurious. In the fourth, the curative effects of the citric acid and lime-juice were about equal, the former being preferred by the patients as being more palatable; those to whom the nitre was given, complained of its acting on the kidneys, and causing constipation of the bowels. In the fifth, (the only vessel in which it may be

said the experiment was fairly tried,) the usual allowance of lime-juice was withheld from the prisoners, in order that the effects of each remedy might be the more clearly observed, if scurvy occurred on the voyage. It consequently made its appearance before the ship had crossed the equator. Forty-five patients, in all stages of the disease, were selected and treated in three divisions, according to the instructions. The plan was rigidly followed out for a fortnight, when the nitrate of potash was found to be acting so injuriously, and to be taken with so much reluctance, that its use was altogether abandoned. All the patients in the division to which it was given, rapidly lost ground, while those in the other two improved or remained nearly stationary. The lime-juice was supposed to have a slight superiority over the citric acid. In the sixth, the disease, under the potash plan of treatment, was found either to be aggravated or to remain stationary. The lime-juice, although it had been daily administered as a preventive during the early part of the voyage, when given more frequently and to a greater extent, was considered to be more effective than the citric acid; but both were useful. In the seventh, in which the remedies hardly had a fair trial, each division improved gradually, but that to which the nitrate of potash was given, the fastest. In some instances, in which it disagreed with the patients, they were removed to the lime-juice list. The dose was fifteen grains per diem. There were altogether thirty-one cases of scurvy, which were cured in a little more than three weeks; they could not, therefore, have been of a very severe character. In the eighth, the remedies were considered to be of equal value. The experiment, however, was interrupted at an early stage, by the arrival of the vessel in port. In the ninth, the daily allowance of lime-juice was not issued, consequently, as in the fifth, the disease made its appearance before she crossed the equator. Thirty-four prisoners were arranged in divisions, and placed under treatment on the 6th of September, 14 upon lime-juice, and 10 on each of the other remedies. On the 11th day of the treatment they were examined, when it was found, that out of the 14 on lime-juice, 3 were well, 9 better, and 2 stationary. Of the 10 on citric acid, 3 were well, 5 better, and 2 stationary; and of the 10 on nitre, 2 were well, 7 better, and 1 stationary. It would thus appear, that the patients improved under the use of all the remedies, the advantage being slightly in favour of the vegetable acids. Lime-juice appears to have been given, instead of the nitre, in several cases in which the latter disagreed. In the tenth ship, the nitrate of potash and citric acid, for the first few days, appeared to be acting favourably; but, as many of the patients, in each of the three divisions, began to get worse, the use of the medicines singly was abandoned. Afterwards they were given in combination, but without any satisfactory result.

The diet of the patients in all these trials was altered, and considerably improved by the substitution of preserved meats and soup, instead of salt meat, to which were added puddings of rice and flour—an increased allowance of tea and sugar, together with port-wine and sago occasionally, as they seemed to be required; thus rendering it exceedingly difficult in some instances, and altogether impossible in others, to arrive at any thing like a proper estimate of the positive abstract advan-

tages attributable to the different medicinal and dietetic agents employed. There seems to be, however, little reason to doubt, judging from the results in these trials, and from others which were not so well conducted, that the alkaline salt has not the antiscorbutic properties which have been ascribed to it; while, from its nauseous, mawkish taste, and injurious effects on the system generally, unless in very minute doses, it would be worse than cruelty, under any circumstances, to persist in its exhibition in this disease, either as a prophylactic or as a means of cure.

The other two remedies, when given in combination with wine and sugar, in the form of lemonade or sherbet, form a beverage highly prized by the patients in every stage of the disease. Their relative value as remedial agents, if an opinion may be formed from these experiments, seems to be nearly on a par, although it is necessary to bear in mind that the lime-juice might probably have acted with better effect, or at all events its action would have been more apparent at the time of trial, had it not been that its influence in exciting the digestive organs to a more healthy formation of chyle, was greatly diminished from long-continued use previously. Citric acid as a preventative has hardly yet been fairly tried; neither has either of these remedies, much as they are extolled, been tried without sugar,—an article of itself highly nutritious, agreeable to the palate, and generally much relished when the appetite begins to flag, under the protracted use of the ordinary sea rations. It seems, therefore, by no means improbable, that the effects of both remedies have been considerably enhanced by the sugar, in combination with which they were given. The latter, in fact, is not only a nutritious and wholesome substance, but, like salt, it acts as a condiment when combined with certain other articles of food, rendering them not only more acceptable to the palate, but more suitable to the organs of digestion and assimilation.

In consequence of the apparent occasional failure of lime-juice, when given as a prophylactic on long voyages, it has been somewhat hastily assumed by one or two writers, that it has not the properties attributed to it. The following circumstance, however would lead to a very opposite opinion. In the year 1842, fifteen vessels left England with prisoners for Van Dieman's Land; in three of these only did scurvy assume anything like a severe form. This naturally led to the inquiry, whether there was anything different or peculiar in these vessels; in the physical condition of the men when they embarked, or in their diet and mode of living afterwards, to account for the appearance of the disease in them, and not in the others; for it was hardly possible to suppose it could be merely the result of chance. The provisions were obtained exclusively from the stores of the Royal Naval Yard at Deptford, and it may, therefore, be supposed that they were in every respect the same, and of good quality. The vessels were fitted up and ventilated much in the same manner, and the prisoners, who were obtained from similar sources, and to all appearance in the same condition of health, fit for the voyage when embarked, occupied relatively the same room in each; the provisions and "medical comforts" were issued in the same manner in the whole of the fifteen vessels, with two exceptions; in these, as previously noticed, the usual allowance of lime-juice and sugar, one ounce

of each per diem for every man on board, for reasons that need not be stated here, was withheld from the prisoners during the early part of the voyage. In both vessels scurvy appeared soon, and attacked a large proportion of the prisoners with great severity, rendering it necessary for both the vessels to put into the Cape of Good Hope for refreshments; while in twelve of the fifteen vessels, several of which made the passage to Hobart Town in from 110 to 140 days, without touching anywhere, there were but few cases, and these were of trivial importance. In the other vessel, however, in which lime-juice was issued in the usual manner, the disease broke out early, and during the passage, which, nevertheless, was made without touching at any port, it acquired considerable severity. Were it not for the appearance of the disease in this vessel, it might be fairly assumed that it broke out in the two others in consequence of the non-issue of lime-juice; and, after all, the probability is, that such was the case,—for it would appear, that in her, the prisoners, contrary to the usual practice, were only permitted to come on deck for a few hours every day,—a circumstance in itself sufficient to establish the scorbutic diathesis, independently of the want of vegetables and a fresh meat diet.

On a fair view of the question, therefore, it seems but reasonable to infer, that the prisoners in the twelve vessels derived their comparative exemption from the disease, solely in consequence of the greater degree of freedom they enjoyed, and the daily use of lime-juice and sugar; in the two in which they suffered so greatly, that it was in consequence of their having been deprived of their usual allowance of lime-juice and sugar; and in the fifteenth vessel, that they were attacked by the disease in consequence of their close confinement below, in the damp, vitiated atmosphere in an ill-ventilated prison. Hence the inevitable conclusion, that lime-juice and sugar are essentially necessary, as antiscorbutics on long voyages.—*Med. Times, March* 23, 1850, *p.* 213.

7.—*Treatment of Intermittent Fever with a Single Dose of Quinine.*—Dr. Pfeufer, of Heidelberg, states he has had much opportunity of treating this disease, and was formerly in the habit of prescribing from 15 to 20 grains, in divided doses, in the intervals of the paroxysms. Latterly, he had given five-grain doses, until from 40 to 60 grains were taken, and with great success. The number of patients having greatly increased during the bivouacs consequent upon the revolutionary disturbances, the expense of so much quinine was found a serious consideration, and he determined to try, whether by a different mode of administration less might not suffice, and, certainly, if the results he has arrived at are confirmed by others, he will have conferred no ordinary boon upon the distributors of charitable medical relief. He finds, indeed, not only that the expense may be vastly diminished, but the cure expedited and rendered more certain, by administering a *single ten-grain dose* (made into four pills, with ext. of *millefolium*), on a day free of fever. This dose is well borne, none of the inconveniences which result from the long-continued use of small doses, or the tinnitus, giddiness, &c., produced

by very large ones, presenting themselves. The subsequent attack is weaker, and its successors still more so, the convalescent remaining in the hospital from four to eight days. A tabular view of the particulars of 34 cases so treated is given.—*Henle and Pfeufer's Zeit.—Brit. and For. Medico-Chirurg. Review, April* 1850, *p.* 534.

8.—*On the Means of Extending the Protective Power of Vaccination.* By Dr. W. S. OKE, Physician to the Royal South Hants Infirmary.—[Dr. Oke makes the following remarks on the method of performing vaccination.]

1st, No lymph should be taken from a vesicle after it has begun to lose its transparent character, *i.e.*, after the eighth day, and if practicable it should be at once communicated.

2nd, The puncture should be made by carrying the point of a lancet, held flat to the arm, obliquely downwards through the cuticle into the surface of the cutis, and whatever instrument be used to apply the lymph, it should remain inserted a few seconds, and then be wiped upon the orifice.

3d, Six punctures *at the least* should be made, either on the arms or on different parts of the body, for it is not improbable that many vaccinations have failed as a protection from not having made a sufficient prophylactic impression upon the system. The same result occurs in other blood diseases, and why not in this? For example, in scarlet fever and measles. If the blood in either of these be not sufficiently impregnated by the first attack, the constitution has been found susceptible of a second. I have seen six or seven punctures adroitly made by an experienced vaccinator in three or four seconds of time, but as these are apt to result in a *confluent* cluster of vesicles, the more deliberate method is to be preferred.

4th, Where the vaccination has resulted in a single vesicle, it ought not to be disturbed; and it may sometimes be satisfactory to try its efficacy by the test of Mr. Bryce, introduced in 1802. It is this: Re-insert vaccine lymph on the evening of the fifth, or morning of the sixth day; and if the second vesicles, which of course will be comparatively small, grow rapidly, overtake the first, and the whole scab together, it will prove the blood to be impregnated by the first vaccination. And where there are more than one vesicle, if their development should not be satisfactory, Bryce's test will be equally required.

5th, The vesicles should be guarded against accident, attentively inspected during their progress, and any irregularity be accurately noted.

Having thus pointed out what I consider to be the best means of fully carrying out the efficacy of vaccination, it seems right briefly to inquire if there be any method of proving the constitution to be still under its protection, especially when exposed in after-life to the contagion of small-pox?

The only thing that can help us under a feeling of uncertainty is re-vaccination, but this need not be employed till after the expiration of

eight years from the primary vaccination, as, according to Dr. Gregory, its protective power has hardly ever been found to fail for that period of time. Recent active lymph should be used for this purpose, and conveyed at once from arm to arm, in order that *some kind of action* may be produced. If it occasion local irritation, even to a considerable extent, without any *specific* character, the constitution may be considered still under vaccine protection ; but if it result in the development of a normal vaccine vesicle, especially if proved to be such by Bryce's test, it may fairly be inferred, on the other hand, that the primary vaccination had ceased to be a protection.

Re-vaccination in the above point of view is of considerable value, and until the efficacy of one vaccination, like one inoculation, can be confided in as a permanent security, it will undoubtedly be right that vaccinated persons, whenever exposed in after life to the contagion of small-pox, should submit to this test. Medical men more particularly require it, and at reasonable intervals of time.

Lastly, it is a popular notion, that vaccine lymph, from having passed through such a lengthened chain of the human race, must necessarily have degenerated, and, in great measure, have lost its prophylactic power. There is nothing unreasonable in such an apprehension on the part of the community ; in fact some currents of lymph have been found to degenerate, and have, therefore, been abandoned. If ever the *general* current of lymph should become degenerated, and unsatisfactory in its developments, there would certainly be a necessity to derive it afresh from the teats of the cow. Retro-vaccination—that is, passing the failing lymph again through the blood of the animal, would not renew it, nothing short of a new supply from the primary disease could suffice. But such a general degeneration has not happily been experienced, and so long as the humanised vaccine vesicle presents its normal character, it will need no renewal, though it shall have passed through a thousand generations.—*Prov. Med. and Surg. Journal, April* 3, 1850, *p.* 173.

9.—*Case of Small-pox occurring without obvious Contagion.*—By Dr. Banks, Lawrenceville, U. S.—A lady, æt 20, pregnant five months, and of robust constitution, after several days' febrile action, became the subject of a well-marked attack of confluent small-pox. The desquamation was by the fifteenth day in "full blast," when secondary fever arose, and before "she had scaled off," she sank and died, having, about the tenth day, given birth to a child, which was covered with eruption, and lived but three hours. The nature of her case was not understood by her attendants, until it was found that she had become a focus of small-pox contagion, which spread freely among the non-vaccinated. The family of this lady lived in an out-of-the-way place, no small-pox having been within a hundred miles of it, and no intercourse with strangers to the village, or with persons from a distance, having occurred for months. Although she was ill seven days before the special symptoms of small-pox appeared, the eruption in those who took it from

her, or from others who did so, commenced at the end of the third, or beginning of the fourth day.

The editor of the journal in which this case is inserted, refers to two which recently occurred in the Eastern Penitentiary of Pennsylvania, in which the "separate system" is strictly enforced. In one of these cases, the convict had been incarcerated for two years, and the other six.—*Philadelphia Med. Examiner.—Brit. and For. Medico-Chirurg. Review, April*, 1850, *p.* 533.

DISEASES OF THE NERVOUS SYSTEM.

10.—ON THE PHYSIOLOGY OF THE NERVOUS SYSTEM.

[A writer in the British and Foreign Medico-Chirurgical Review enters at considerable length into this subject, founding his observations upon the recent works of Dr. Todd and Dr. Gull. He begins by giving in the words of Dr. Todd, the following statement of some of the most important questions at issue.]

"Having shown that the spinal cord is concerned in voluntary motions and in sensation (mental nervous actions), and in certain reflex actions as well as in certain organic functions (physical nervous actions), it is important to ascertain what is *the mechanism* by which these various actions take place.

"The most convenient way to discuss this point will be to examine into the value of certain hypothesis which have been framed to explain it. We shall find it necessary in this discussion to keep before us two propositions, in favour of which sufficient evidence has already been adduced. These are,—1. That the brain or some part of it is essential to the production of mental nervous actions; in other words, that acts of volition and sensation cannot take place without the brain; and, 2. That the vesicular is the truly dynamic nervous matter, that which is essential to and the source of the development of all nervous power.

"The first hypothesis which we shall notice is one of so much ingenuity, that one is tempted thereby to adopt it, and would gladly do so if it were found sufficient to explain the phenomena, and if it were consistent with that simplicity which characterises the mechanism of the body. It originated with Dr. Marshall Hall, and has been advocated by him with great zeal and ability; it may be distinguished as the hypothesis of an *excito-motory system of nerves*, and *of a true spinal cord*, the centre of all physical nervous actions.

"This hypothesis may be stated as follows.

"The various muscles and sentient surfaces of the body are connected with the brain by nerve-fibres, which pass from one to the other. Those fibres destined for or proceeding from the trunk to the brain pass along the spinal cord, so that that organ is in great part no more than a bundle of nerve-fibres going to and from the brain. These fibres are specially for sensation and volition—*sensori-volitional.*

"But, in addition to these, there is, according to Dr. Hall, another class of fibres proper to the spinal cord and to its intracranial continuation, which form a connexion with the grey matter of the cord. Of these fibres, some are afferent or incident, others efferent or reflex, and these two kinds have an immediate but unknown relation to each other, so that each afferent nerve has its proper efferent one, the former being *excitor*, the latter, *motor*. The aggregate of these fibres, together with the grey matter, constitutes the *true spinal cord* of Dr. Hall, which is not limited to the spinal canal, but passes up into the cranium as far as the crura cerebri. (Its extent, indeed, is much the same as that which has been assigned by Prochaska to his *sensorium commune*.) These fibres are quite independent of those of sensation and volition, and of the sensorium commune, using that term as indicating the centre of intellectual actions. Although bound up with sensitive and motor fibres, they are not affected by them, and they maintain their separate course in the nerves, as well as in the centres.

"2. A second hypothesis is that which accords with the views of Müller and many other physiologists of the present day, and likewise probably with those of Whytt. It assumes that the fibres of sensation and volition proceed to and from some part or parts of the intracranial nervous mass,—that every nerve-fibre in the body is continued into the brain. Those which are distributed to the trunk and extremities pass along the spinal cord, separating from it with the various roots of the nerves, and in their course within the spine mingling more or less with the vesicular matter of the cord. There are, according to this hypothesis, no other fibres but these (save the commissural) and they are sufficient to manifest the physical as well as the mental acts. Nerves of sensation are capable of exciting nerves of motion which are in their vicinity; and they may produce this effect even when the spinal cord has been severed from the brain, for their relation to the grey matter of the cord is such, that their state of excitement is readily conveyed to it.

"3. According to a third hypothesis, it is assumed that all the spinal and encephalic nerves, of whatever function, are implanted in the grey matter of the segments of the cerebro-spinal centre with which they are severally connected, and *do not pass* beyond them. The several segments of the cerebro-spinal axis are connected with each other through the continuity of the grey matter from one to another, and through the medium of commissural fibres which pass between them. Through these means, motor or sensitive impulses may be propagated from segment to segment; and a stimulus conveyed to any segment from the periphery may either simultaneously affect the brain and cause a sensation, or it may be reflected upon the motor nerves of that segment and stimulate their muscles to contract. Or both these effects may take place at the same moment, as a result of one and the same stimulus. According to this hypothesis, each segment of the cord, so long as it retains its proper commissural connexion with the brain (by commissural fibres and continuous grey matter), is part and parcel of the centre of volition, as well as of that of sensation, and the mind is as directly associated with each segment of the cord as it

is with any portion of the encephalon. Let that commissural connexion be dissolved, and the mind will immediately lose its hold upon the cord; but the various segments of that organ may nevertheless still be acted on by physical impulses, and may still continue to evolve the nervous force in connexion with the natural changes which may take place within.

"I am not aware that this view of the mechanism of the various actions of the nervous system had been ever distinctly enunciated, before it had been stated by Mr. Bowman and myself in our work on the 'Physiological Anatomy and Physiology of Man,' in 1845. There is nothing, however, in this hypothesis at variance or inconsistent with the views of Prochaska; for this physiologist seems to have held the opinion, that the nerves are implanted in the segment of the cerebro-spinal axis into which they sink, and do not pass beyond it."

[The reviewer proceeds to say, that the discovery by Mr. Grainger, that from each root of a spinal nerve some fibres were implanted into the grey substance of the cord, and others apparently became continuous with its longitudinal fibres, appeared a very strong argument in favour of Dr. M. Hall's hypothesis. The difficulty is in establishing a direct communication between the cerebrum and the roots of the spinal nerve,—for]

"Although many anatomists still hold to the belief that some of the fibres in each nerve-root are continuous with the longitudinal fibres of the cord, yet this by no means proves that they pass along the cord for any considerable portion of its length, far less that they pass upwards continuously to the grey matter of the cerebrum. And there is a general agreement in the assertion, that the great bulk of the fibres which constitute the roots of the nerves of any segment of the spinal centre, are implanted in the grey matter of that segment, and do not pass beyond it."

[Moreover, it is distinctly shown, the reviewer remarks, that the white matter of the cord does not increase in amount from below upwards, as it ought to do on Dr. Hall's hypothesis, but is greatest where there is the most ganglionic enlargement. He goes on to say]

"It is pointed out by Dr. Todd, that the only channel by which the will can influence the spinal cord being (as generally admitted) through the fibres of the anterior pyramids, it is highly improbable that these fibres should form the aggregate of those by which the will can exert its influence upon the spinal nerves; the whole of them on *both* sides, collected together, scarcely equalling in bulk the anterior portion of *one* of the antero-lateral columns of the spinal cord.

"From these facts we seem justified in inferring, that the spinal cord is the *chief* centre for the roots of the spinal nerves; that a considerable portion of the white strands of the cord is composed of fibres which are passing a little way upwards or downwards, so as to reach segments of its ganglionic centre a few removes from the point at which the nerves join the cord, just as, according to Mr. Newport, the fibres of the ganglionic column may be seen to do in the articulata; and that if any of the fibrous strands pass continuously between the roots of the nerves and the encephalic centres, the proportion is so small that it cannot be

regarded as adequate to supply the demands of Dr. M. Hall's cerebral or sensori-volitional system. We are not disposed, however, to deny the passage of some such continuous fibres; on the contrary, it seems to us that the analogy of the fibrous tract in the articulata is strongly in favour of their existence, and that the admission of them as passing, not to the cerebrum, but to the sensory ganglia, and as forming, not a system distinct from the spinal, but a portion of that automatic system of which the spinal is itself but a part, is almost necessary to our explanation of the phenomena which we seek to comprehend, and at the same time will convert all the arguments in favour of the 'distinct system,' founded upon a somewhat erroneous interpretation of the anatomy and physiology of the articulata, into arguments in support of the simpler view which we shall endeavour to establish.

Another difficulty which we may notice as involved in the doctrine of the "distinct system," has reference to the emotional actions. These were considered by Dr. M. Hall to take place through the instrumentality of the "true spinal" fibres; but reasons were urged by Dr. Carpenter against this doctrine, which rested solely upon the fact that emotional actions may take place in parts which are paralysed to the will. Arguing from the fact that the emotions can only be excited through the sensations, and chiefly through those of the special kind, Dr. Carpenter considered that we must recognise the existence of a third class of fibres, having their special centres in the ganglia of sense, and independent alike of the cerebral and the spinal. Dr. Todd recognises the necessity of this extension of the doctrine of a distinct system, if it be adopted at all, and makes the following just and pertinent remarks upon it.

"It is difficult to admit the existence of three orders of fibres in each muscle, which, to be effective, must have the same relation to the elements of the muscle. It is impossible to imagine how each order of fibre should comport itself with reference to the other two, so that their actions may not interfere. Nor can any one fail to perceive that the emotional fibres must be infinitely less frequently employed than the others, and in some individuals so seldom called into action as to be greatly exposed to the risk of atrophy for want of use."

With regard to the second hypothesis, there is no necessity for any lengthened argument; since the facts already adduced clearly prove that the great mass of the fibres, of which the roots of the spinal nerves are composed, *cannot* pass on to the brain.

The third hypothesis has the recommendation of being much more in accordance than either of the preceding with the anatomy of the spinal cord, as we now understand it; since it regards each segment as the centre of its own proper nerves, all centripetal impressions being received in the first instance by it, and all motor impulses finally proceeding from it; whilst by the connexions established through commissural strands between the different segments of the cord itself, and between the cord on the one hand and the cerebrum and cerebellum on the other, the impressions first conveyed to the cord are carried on to the sensorium so as to produce sensations, whilst motor impulses originating in the cerebrum are brought to act upon the muscles, by being directed to the segment of the

cord whence their nerves proceed. This hypothesis has the great merit of simplicity ; for it assumes that all muscular movements, whether reflex, emotional, or voluntary, are immediately called into action by the same efferent fibres ; and that the very same afferent or excitor fibres are the channels of the transmission of stimuli which give rise to reflex actions through the spinal cord, and of impressions that become sensations when transmitted to the sensorium. The mechanism of reflex action, on this hypothesis, is precisely the same as on Dr. M. Hall's ; but the mechanism of sensation and of voluntary motion are at first sight more complex. These phenomena are thus explained by Dr. Todd ;

"The mechanism of a voluntary action in parts supplied by spinal nerves would be, according to this hypothesis, as follows :—The impulse of volition, excited primarily in the brain, acts at the same time upon the grey matter of the cord (its anterior horn), and through it upon the anterior roots of the nerves implanted in it. This grey matter, in virtue of its association with the brain by means of the anterior pyramids, becomes part and parcel of the organ of the will, and therefore as distinctly amenable to acts of the mind as that portion which is contained within the cranium. If we destroy the commissural connexion with the brain through the pyramidal fibres, the spinal cord ceases to take part in mental nervous actions ; or, if that connexion be only partially destroyed, that portion of the cord which the injured fibres had associated with the brain is no longer influenced by the mind. Again, if the seat of volition in the brain be diseased, the cord, or part of it, participates in the effects of the disease as far as regards voluntary actions. That it is not too much to ascribe such power to the pyramidal fibres appears reasonable, if we consider how the fibres of the corpus callosum, and perhaps other transverse commissures, so connect the hemispheres and other parts of the brain, that the separate divisions of a double organ act harmoniously, so as to excite but a single train of thought, or, conversely, that two impressions from one and the same source on a double sentient organ are perceived as single by the mind.

An objection to this explanation will readily be raised—namely, that the excitation of the anterior horn of the grey matter, in the way stated, does not explain the remarkable power which the will has of *limiting* its action to one or two, or a particular class of muscles. To this, however, it may be replied, that there can be no reason for denying to the mind the faculty of concentrating its action upon a particular series of the elementary parts of the vesicular matter, or even upon one or more vesicles, if we admit that it can direct its influence to one or more individual fibres, as the advocates of the first and second hypotheses do. If, indeed, we admit the one, we must admit the other ; for, whether the primary excitation of a fibre take place in the encephalon or in the spinal cord, the part first affected must probably be one or more vesicles of grey matter.

"The series of changes which would develope a sensation admits of the following explanation, according to this hypothesis :—A stimulus applied to some part of the trunk or extremities is propagated by the sensitive nerves to the *posterior* horn of the grey matter of the spinal cord, and from the junction of this part with the brain, either through

the direct continuity of the vesicular matter of the cord with that of the centre of sensation, by the olivary column, or through longitudinal commissural fibres, analogous to or even forming a part of the anterior pyramids, this is simultaneously affected. To this, likewise, it will be objected, that the limitation of sensation is not sufficiently explained. But the reply is obvious ; the *intensity* and *kind* of sensation depend upon the nature of the primary stimulus at the surface, the *extent* upon the number of fibres there stimulated. Wherever these fibres form their proper organic connexion with the vesicular matter, that matter will participate in their change to an extent proportionate to the number of fibres stimulated, and with an intensity commensurate with the force of the primary stimulus. It is not necessary to the development of sensation, that the fibre stimulated should be implanted directly in the brain ; if it be connected with this centre through the medium of vesicular matter or through commissural fibres, all the conditions necessary for the development and propagation of nervous force would appear to be fulfilled. It must not be supposed, however, that, in making this statement, we mean to assign the spinal cord to be the *seat* of sensation ; all we assert is, that the posterior horn of the grey matter, as being the part in which the sensitive roots are implanted, is the seat of physical change excited by the stimulus applied to the sensitive fibres, which change must be *perceived* by the mind before true sensation can be produced. In fine, by the union of the posterior horns of the spinal grey matter with the vesicular matter of the brain, they become a part of the centre of sensation so long as that union is unimpaired."

Now we are of opinion that there is evidence that the mechanism of voluntary movement is very much what Dr. Todd represents it to be ; and that the cerebrum does *not* directly act upon the muscles, but exerts its influence upon that other portion of the nervous centres, from which their nerves immediately proceed. This evidence we shall presently consider. But we cannot find any such indications of an intermediate process in the case of sensation ; on the contrary, everything tends towards the conviction in our minds, that the reception of a sensation by the sensorium is a process as direct as the reception of a physical stimulus (as Dr. Todd terms it) by the spinal cord ; and, moreover, there is to us ample proof that there is a class of actions as purely "reflex" as those of the spinal cord, in which sensation is a necessary participant. This was long ago seen by Unzer and Prochaska, who very wisely, we think, made their "sensorium commune" include the centres of sensation ; and who drew a distinction between reflex actions *with* sensation, and reflex actions *without* sensation, of which not only Dr. M. Hall, but also Dr. Todd, appears to us to have lost sight. As a further elucidation of the nature of Dr. Todd's hypothesis, we shall quote the following passage from his second Lumleian lecture.

"The brain and spinal cord (and I beg to state that I use these terms to signify respectively the intra-cranial and intra-spinal nervous mass), as the great centres of the nervous system—the great nervous battery of the body—show distinctly a division into two portions : one in which nerves are implanted ; the other which has no immediate connexion with nerves, and communicates with them only through the medium of

the former part. Thus, in the brain, the hemispheres, the corpora striata, the optic thalamus, the tubercula quadrigemina, and the large mass of vesicular matter connected with them and the cerebellum, have no immediate connection with nerves—no nerve is implanted in any one of these centres. The functions of these centres are all of a mental nature,—either the development of intellectual change, or the exercise of volition, or perception, or emotion, or the balancing and co-ordinating of movements,—and they exercise a control over the various segments of that portion of the cerebro-spinal centre in which nerves are implanted, through commissural fibres, which pass from them to the various segments of that centre. That part of the cerebro-spinal axis in which nerves are implanted—which was fully recognised by the distinguished Prochaska, and by him designated the *sensorium commune*—this part is in itself incapable of originating any nervous action, except in virtue of some physical change in it: it cannot develope any mental action except in obedience to a stimulus from some of those centres already mentioned as belonging to the encephalon. This part extends from the upper part of the crura cerebri to the extremity of the spinal cord, and all its actions are physical, unless when excited and guided by any of the encephalic centres. It is the centre of all those reflex actions which take place through the spinal or encephalic nerves."

The fundamental principle of Dr. Todd's hypothesis we believe to be perfectly just; and the views of the constitution and actions of the nervous centres which we have now to propound, will be based on a full recognition of it. In fact, it may be regarded as the result of the combination of Dr. Todd's doctrine of the *singleness* of the root-fibres of the spinal nerves, and of the derivation of the power of the motor nerves from the spinal cord alone, with the view of the relative offices of the several divisions of the encephalic centres which was put forth in the pages of one of our predecessors, (Brit. and For. Med. Rev., Oct. 1846;) and, by means of this combination, we find ourselves brought back, with the most singular exactness, to the main positions assumed by Unzer and Prochaska. In fact, we may consider ourselves as expounding *their* doctrines, with the additional light derived from our improved knowledge of anatomy, both human and comparative, and of the *modus operandi* of the nervous system in general.

The fundamental or essential part of the nervous system, in all animals, is that which responds *automatically* to external stimuli;—that is, the system of *afferent* nerves, by which the influence of stimuli is conveyed from the periphery to the centres; the system of ganglia by which it is received and reflected, without any exertion of intelligence or will; and the system of *efferent* nerves, by which the motor impulse thus called into play is conveyed to the muscles. The automatic action is essentially the same, whether it involves the excitement of sensation, or whether it is performed without any consciousness whatever; the difference depending merely upon the conveyance of the stimulus to a part of the ganglionic centres which is subservient to consciousness, or to the parts which have no such relation. *The nervous system of the articulated animal affords the type of a purely automatic apparatus.* It consists of a series of ganglia connected by longitudinal cords, which pass along the

ventral surface of the body ; and of a pair of ganglia seated in the head, but connected with the highest ganglion of the ventral series by fibrous cords of precisely similar characters to those which pass between the latter. Each ganglion has nerve-trunks especially connected with itself ; those of the ventral cord being distributed to the muscular system and to the surface of the body ; whilst those of the cephalic ganglia chiefly serve to connect them with the organs of sense. But the connexions of the nerve-trunks are not exclusively limited to the ganglia of their own segments ; for, according to the statement of Mr. Newport, some of their fibres pass along the cord to ganglia above or below, thus forming part of the fibrous strands which connect the ventral ganglia with each other ; whilst others are directly connected with the cephalic ganglia, by means of the fibrous column which overlies the ganglionic. This last assertion is doubted by Dr. Todd ; but, as it seems to us, upon no sufficient grounds. It is not disputed that the cephalic ganglia are the centres of *sensation*, and that the optic nerves pass directly into them : why, then, should not *other* sensory nerves pass into them with equal directness? Moreover, if some of the fibres of the nerve-roots pass along the interval between one, two, or more segments, to reach remoter ganglia of the ventral cord, why should not others pass along its entire length, to reach the cephalic ganglia ? It is distinctly affirmed by Mr. Newport, that he has traced fasciculi of nerve-fibres passing continuously between the cephalic ganglia and the roots of the nerves of the trunk, without entering any other ganglion ; and until this assertion has been disproved, we think that Mr. Newport's well-known accuracy ought to serve as a warrant for its reception.

But its admission will not by any means involve the doctrine of the "distinct system ;" on the contrary, the anatomical study of the nervous system of the typical articulata, and the careful analysis of their actions, lead us to the conclusion that the *whole* apparatus is of an *automatic* character, answering precisely to the "sensorium commune," of Prochaska ; and that *all* its actions may be designated as *reflex*, being performed in direct respondence to external, or, as Dr. Todd terms them, "physical stimuli, without any interference or modification (except in those somewhat aberrant forms which most nearly approximate to vertebrata) from intelligence or will. The movements of each individual segment, called into action by external impressions, are immediately dependent upon its own ganglion ; but those of the several segments are associated together, partly by the commissural fibres that pass between the ganglia, and in part, perhaps, by the connection of each nerve-root with ganglia above and below ; and the guidance and direction of the whole train is effected by the cephalic ganglia, which are called into play by the impressions made on the proper sensory nerves, and which exert their influence by means of the commissural fibres that pass down from them to the ganglia of the central cord. Such we believe to be the mechanism, not only of the ordinary locomotive actions of these animals, but of all those wonderful operations which we are accustomed to designate as *instinctive*. The former chiefly originate in impressions made on the ventral ganglia themselves ; and only need the control and direction which the cephalic ganglia exercise over them, in virtue of the sensations

received by the latter. But the "instinctive" operations would seem to be primarily dependent upon sensations, some of them derived from external impressions, but others originating in the body itself; and we regard them, therefore, as belonging to Prochaska's category of reflex actions involving sensation; although they seem to have been considered by Unzer as independent even of sensation. The wonderfully *adaptive* character of these actions is no more reason for considering them as otherwise than automatic, than it is for regarding the ordinary reflex actions as dependent upon the designing will of the individual that performs them; what, for example, can be more nicely adjusted for a special purpose, than the various muscular movements concerned in the act of *sneezing*, which may be regarded as a very good example of the reflex movements with sensation? The close relation, in fact, between sneezing, coughing, and the ordinary movements of respiration, which are all equally *automatic*,—although the first is certainly dependent upon the excitement of a sensation, and the second is perhaps so, whilst the latter are merely (in Dr. M. Hall's phrase,) excito-motor,—strongly indicates the unity of the apparatus by which they are carried into effect; and should of itself lead us to question the correctness of Dr. Todd's complete separation of the sensorial apparatus from the spinal.

Interpreting the anatomy of vertebrated animals, then, by that of the articulated, we should view the spinal cord, the medulla oblongata, and the whole series of ganglionic centres connected with the nerves of sensation, and lying along the base of the skull in man, as far forwards as the olfactive ganglia, as constituting the apparatus of automatic action; and should look upon the cerebrum and cerebellum as organs superadded to this for purposes peculiar to vertebrata, making use of it as their instrument, and not having any communication either with organs of sense or with the muscular system, except through its intermediation. The proper *cerebral* portion of the nervous system, in our apprehension, consists of the superficial layer of vesicular matter, and of the fibres which connect the different parts of this with each other, thus constituting what Mr. Solly terms the "hemispheric ganglia;" to the exclusion of the thalami optici, corpora striata, and corpora quadrigemina. The hemispheric ganglia are connected with the automatic apparatus by that great series of fibrous communications which pass in a more or less radiating manner from the corpora striata, thalami optici, corpora quadrigemina, and other parts of the summit of the automatic apparatus, towards the vesicular matter of the hemispheres; and here, as it appears to us, rather than in the pyramids, are the commissures by which the cerebrum is brought into connexion with the automatic centres. The pyramids, together with the other fibrous strands of the medulla oblongata, are obviously the homologues of the diverging cords that pass around the œsophagus of articulata, to connect the cephalic or sensory ganglia with the first ganglion of the ventral cord; and we cannot see any reason for regarding them as having any other function in vertebrated animals, than in like manner to connect the sensorial ganglia contained in their cranium, with the spinal cord, which answers to the ventral series of ganglia in the articulata. Interpreting the structure of the spinal cord by the connexions distinguishable amongst the latter,

we should be disposed to regard each pair of spinal nerves, with Dr. Todd, as being especially connected with its own segment; but as probably communicating with other segments, above and below, by fibres which enter into the composition of the fibrous columns of the cord; and as having a direct communication also, by continuous fibres, with the sensory ganglia lodged within the cranium. Until such communication shall be disproved, we must regard all analogy as in its favour; for we certainly have no reason to suppose, from any other source of information, that the communication between an organ or surface, possessed of sensibility, and the sensorial centres, is otherwise than *direct*. But we should no more regard the fibres that pass on to the cephalic ganglia as entitled to rank as a "distinct system," than we should consider the fibres that may pass on to segments of the spinal cord, above or below those with which their trunks are mainly connected, as having claim to such a designation. They appear to us to constitute a part of one and the same system of automatic action; the operations of which will necessarily involve sensation, or will be essentially independent of it (although usually accompanied by it), according as they take place through the instrumentality of the upper or sensorial, or the lower or non-sensorial, portion of the apparatus.

We do not, however, affirm that a continuity of *fibrous* structure is necessary for the transmission of nervous agency, or to use Dr. Todd's more correct phrase, for the excitement of nervous polarity. On the contrary, we agree with Dr. Todd that there is adequate evidence that the vesicular substance may be subservient to this purpose. For it has been established by the experiments of Stilling and Van Deen, that both sensory and motor impressions can be communicated from one portion of the spinal cord to another, when sections are made in such a manner as to leave the two portions connected only by grey substance. And in no other way can we account for the *radiation* of impressions, in certain states of exalted activity of the automatic centres; a sensorial impression, for example, in a hysterical subject, spreading from the nerve which conveyed it to many others, so that the slightest touch produces a painful sensation over a large surface; and in like manner, the slightest irritation, in the tetanic state, whether that state be natural or artificially induced by strychnine, serving to throw a large number of muscles into powerful and simultaneous contraction. Still we think it probable that all the *ordinary* automatic movements, especially those most directly connected with the maintenance of the organic functions, *are* produced through the instrumentality of a direct fibrous communication between the part to which the stimulus is applied, the ganglionic centre, and the muscles thrown into contraction. For such direct communication is evident enough in the case of the respiratory and pharyngeal centres in the invertebrata; each of which seems to be the immediate instrument of all the movements for which it is specially provided. And there is no reason why the lodgment of these centres in the medulla oblongata of vertebrated animals should interfere with their directness of connexion, the one with the respiratory apparatus, and the other with that of deglutition. On the contrary, we think that in the fact of the supply of many of the muscles of the lower jaw by *two* motor nerves, the

portio dura seeming to be the instrument of their respiratory and expressional movements, and the fifth pair of those of mastication and deglutition; there is an indication that these centres remain distinct, and that their connexion with the muscles, as well as with the sensory surfaces, is by fibres of their own.

Referring to the article to which we have already alluded, for various proofs of the existence of a class of actions in man, as purely *reflex* as those to which the term is ordinarily applied, but involving the excitement of *sensation* as a necessary link in the chain of operations, —a class to which we do not perceive that Dr. Todd makes any reference, and the absence of any comprehension of which seems to us to be the essential defect of his physiological system,—we have now to inquire into the relation of the cerebral or hemispheric ganglia to the sensory and motor apparatus. That they are not the seat of sensation, and have no participation in purely automatic actions, we believe that there is no occasion to argue; since most comparative anatomists regard the sensorium as seated in the ganglionic centres of the sensory nerves. On the other hand, it is generally admitted that they are the instruments by which ideas are formed, by which reasoning processes are carried on, and by which the will exerts its power. We should expect, then, that they would derive their first stimulus to action from the sensorial centres, which would communicate to them the influence of the sensations therein formed; and anatomy furnishes, as we have already pointed out, the required fibrous connexions. We have dissented from Dr. Todd's notion that the mechanism of *sensation* involves a *double* ganglionic action; but we think that this double action is clear enough in regard to *perception*, or the formation of a notion or idea in regard to the object of sensation, of which the excitement of sensation in the sensorial ganglia is the first stage, this sensation being itself the stimulus to the secondary action of the cerebral ganglia. And in like manner, as we shall now proceed to show, in the performance of a voluntary movement; that is, a movement *designed* by the individual to carry into effect a given purpose; the cerebrum does not act directly upon the muscular system, but uses the automatic apparatus as its instrument.

Every one who has attentively considered the nature of what we are accustomed to call *voluntary* action, has been struck with the fact that the will simply determines the *result*, not the special movements by which it is brought about. If it were otherwise, we should be dependent upon our anatomical knowledge for our power of performing the simplest movements of the body. Again, there are very few cases in which we can single out any individual muscle, and put it into action independently of others; the cases in which we *can* do so are those which a single muscle is concerned in producing the result, as in the elevation of the eyelids; and we then really single out the muscle and cause it to contract, by "willing" the result. Thus, then, however startling the position may at first appear, we have a right to affirm that the will cannot exert any direct or immediate power over the muscles; but that its determinations are carried into effect through the intermediation of some mechanism, which without any further effort on our parts, selects and combines the particular muscles whose contractions are

requisite to produce the desired movement. This conclusion, at which we arrive by an analysis of our own consciousness, is in perfect harmony with the inferences which we should draw from the anatomical relations of the cerebrum; for we have found strong reason to believe that the cerebrum does not directly transmit any fibres to the muscular system, but that its operations are exerted through those fibres, which pass between the surface of the hemispheres and the chain of ganglionic centres at the base of the cranium that constitutes the summit of the automatic apparatus. And thus, as the sensorium *plays* (so to speak) upon the cerebrum, sending to it sensations in order to call forth its activity as the instrument of the purely mental operations, so does the cerebrum, in its turn, *play* downwards upon the motor portion of the automatic apparatus, sending it volitional impulses, which excite its motorial activity. Thus, then, even what we are accustomed to consider our *voluntary* movements are in their immediate and essential nature *automatic;* their peculiar character being, that whereas the ordinary automatic movements are excited by *external* stimuli, impressional or sensational, conveyed by the afferent nerves, the volitional movements are excited by a stimulus proceeding from the cerebrum, and conveyed along what Reil, with great sagacity, termed the nerves of the *internal* senses.

Our idea of the mechanism of voluntary movement, then, is essentially the same with that of Dr. Todd; the chief difference being that *we* regard the automatic apparatus as including that series of sensory ganglia which *he* considers to be an appendage to the cerebrum; so that the real commissures between the cerebral and automatic apparatus are, in *our* apprehension, the fibres of the white substance of the brain, radiating from the thalami optici, the corpora striata, &c.; whilst in *his* they are the strands of the medulla oblongata, especially the anterior pyramids. Now we cannot but think that, if Dr. Todd will bear in mind the disproportion between the amount of radiating fibres in the cerebrum, and the size of the pyramidal columns, he will see that there is the same difficulty in conceiving that these columns can be adequate to convey the whole cerebral influence downwards to the spinal cord, as he has himself pointed out in the doctrine that they contain all the fibres of communication between the cerebrum and the motor nerves. On the other hand, if we look at the strands of the medulla oblongata as simply commissures between the cranial and spinal portions of the automatic axis, and look upon the cerebrum as connected with the upper end of that axis, by the whole of those radiating fibres which pass from it to the hemispheric ganglia, the anatomical arrangements seem to be in much better harmony with the physiological facts. For there can be no doubt that, in adult man, nearly all the movements not immediately concerned in the maintenance of the organic functions are the result of voluntary direction; the greater number originating in a determination of the will, and the remainder being guided and controlled by it. Consequently we should expect that the connexion between the cerebral and the automatic portions of the cerebro-spinal apparatus should be of the most extensive and varied nature, such as we find to exist in the fibrous portion of the cerebral hemispheres.

The views which we have advanced as to the really automatic cha-

racter of voluntary movements, and the inclusion of the sensorial centres in the automatic, rather than in the cerebral, division of the apparatus, appear to us to be in most singular harmony with the phenomena of those movements which were not unaptly designated by Hartley as "secondarily automatic," having been voluntary in the first instance, but having been brought by habit into more or less complete independence of the will. Such actions, in fact, take the place in man of those which are primarily and purely automatic in many of the lower animals. Take, for example, the movements of progression. In the first instance they are performed in sole respondence to the will. Whilst the child is learning to walk, every single effort has a voluntary source; but still its immediate dependence on the automatic mechanism is evident in the necessity for attention to the guiding sensations as the regulators of the voluntary effort. As the habit of movement becomes more and more established, however, we are able to withdraw both the attention and the voluntary effort, to such a degree that at last it is only necessary for the will to start or commence the actions, and to *permit* their continuance. We think that no one can doubt this, who can analyse his own consciousness as to those states of "reverie" in which the mind is completely withdrawn from the contemplation of external objects, and is concentrated, as it were, upon itself. A person who is subject to such fits of "absence of mind," may fall into one of them whilst walking the streets; his whole attention shall be absorbed on his train of thought, so that he is conscious of no more interruption in its continuity, than if his body were perfectly at rest, and his reverie were taking place in the quietude of his own study; and yet during the whole of that time, his limbs shall have been in motion, carrying him along the accustomed path; and his vision shall have given the direction to these movements, which is requisite to guide him along a particular line, or to move him out of it for the avoidance of obstacles. In such a case it would seem as if the contact of the foot with the ground, in making each step, was the stimulus to the next movement; and as if the visual organs exerted just the same automatic guidance over the direction of the progression, as they appear to do in animals which do not possess a distinct organ of intelligence and will. The complete occupation of the mind in other ways, as in close conversation or argument, is equally favourable to this independent action of the automatic apparatus in progression; and many other cases might be cited, in which an habitual train of actions, such as reading aloud or playing on a musical instrument, is not interrupted by the complete withdrawal of the attention and consequent suspension of voluntary effort.

[The reviewer thus sums up the positions which he has endeavoured to establish:]

I. The sensorial ganglia, medulla oblongata, and spinal cord of vertebrated animals; the cephalic ganglia and ventral chain, which are the homologues of these parts in articulata; are the immediate instruments of *all sensorial and motor changes:* and by their sole and independent action are produced all those movements, which, being unprompted by the will, or even taking place in opposition to it, are said to be *automatic*.

These automatic movements may be excited either by sensations, or by impressions which do not necessarily affect the consciousness; and this would seem to be the mode in which *all* the actions of insects and other animals destitute of a cerebrum are called forth and directed. The number of purely automatic actions diminishes in proportion to the development of the cerebrum, and to the subjection of the automatic apparatus to its control; but even in man, those most closely connected with the maintenance of the organic functions remain quite independent of the will, and most of them do not require consciousness for their excitation. And when the activity of the cerebrum is suspended or otherwise directed, without any affection of the automatic apparatus, movements which have been long habitually performed in a particular manner may be kept up, when the will has once set them in action, through the automatic mechanism alone.

2. On the other hand, the cerebrum is the instrument of purely mental operations, and has no direct connexion with the external world. It receives all its stimuli to action through the sensorial ganglia; and it exerts all its influence upon the muscular system, through the centres of automatic movement. Hence it may be said to be played upon by the sensorial portion of the automatic apparatus, and to play upon its motor portion. An *idea* with which a pleasurable or painful *feeling* is associated, may act emotionally (as we say) upon the automatic apparatus, without any voluntary direction, or even in opposition to it. The will may be exerted in antagonizing, strengthening, guiding, or controlling the automatic actions; but in every case, the muscle directly receives its power from the automatic centre; and the very same movement may be automatic, emotional, or voluntary, according as the motor influence has been excited in the centre from which the nerve proceeded, by an external stimulus acting through an afferent nerve, or by an emotional impulse transmitted downwards from the sensorial centres, or by a volition originating in the cerebrum.—*Brit. and For. Medico-Chirurg. Review, Jan.* 1850, *p.* 3.

11.—ON THE PATHOLOGY OF CONVULSIVE DISEASES.

By Dr. R. B. Todd, &c.

[The following remarks are from an article upon Dr. Todd's theories of convulsive diseases in the British and Foreign Medico-Chirurgical Review. The writer says]

The following is Dr. Todd's general conclusion in regard to the seat of the morbid affection which gives rise to the epileptic paroxysm:

"The part of the encephalon primarily disturbed, is the hemispheric lobes: if the disturbance do not go beyond a certain point, the phenomena are limited to loss of consciousness and impaired intellectual action, with more or less of sopor. But if the disturbance be considerable, then the tubercula quadrigemina and mesocephale become involved, and *epileptic convulsions* are produced. If the disturbance of this centre be very

great, the medulla oblongata and the medulla spinalis become much excited, and the convulsions are complicated with a good deal of the tetanic character.

"We know that there is great variety in the intensity of the epileptic paroxysm, i. e. not only in the intensity and duration of the coma, but also in the violence of the muscular paroxysm. All this depends on the nature and force of the primary disturbance in the cerebral hemispheres, but in all instances the hemispheric lobes are first disturbed; next follow the corpora quadrigemina; and upon the intensity of their disturbance depends the extent to which the medulla oblongata and the spinal cord are engaged."

[On this, the Editor of the British and Foreign Medico-Chirurgical Review observes:]

As our physiological view of the relation between the cerebrum and the ganglionic centres on which it is superposed, differs in some important points from Dr. Todd's, our readers will be prepared to expect that we do not altogether accord in Dr. Todd's conclusion. Looking to the whole assemblage of ganglionic centres interposed between the cerebrum and the spinal cord, as, on the one hand, the centres of sensation (and probably also of the consciousness of the cerebral operations, as well as of impressions on the organs of sense), and on the other, as forming the summit of the apparatus from which motions are directly excited, we cannot but think that they are the parts of the encephalon *primarily* affected, and that the affection of the hemispheres is secondary. For all that Dr. Todd adduces in regard to the premonitory sensations is best explained on this view; and it is in singular harmony with the fact, that whilst loss of consciousness and convulsive movements are usually combined in the epileptic paroxysm,—the morbid action radiating upwards into the cerebrum, and downwards into the motor apparatus,*—either may occur independently of the other. The loss of *consciousness* is evidently the primary and essential phenomenon; the disturbance of the *intellectual* functions is obviously secondary and accidental.

[The reviewer then gives the following account of Dr. Todd's theory of epilepsy:—]

The epileptic paroxysm is the manifestation of a state of abnormal nutrition of certain parts of the brain, which shows itself in an undue development of their nervous force, or, to use Dr. Todd's language, in a disturbance of their polar state; and this, when it has attained a certain measure of intensity, manifests itself in the epileptic paroxysm, just as a Leyden jar, when charged with electricity to a certain state of tension, gets rid of the disturbance by the 'disruptive discharge.' This state of tension of the brain he regards as resulting from "the

* If Dr. Todd's former assertion be true, that no nerves terminate in the corpora quadrigemina, we are rather at a loss to understand how irritation of their substance can excite convulsive movements, except through the intermediation of the spinal cord or medulla oblongata. Our own opinion has been already stated, that as they are the centres of sensory nerves, so do they give origin to motor fibres.

accumulation of some material in the blood, which, acting on the brain as a poison, excites this polar state, and this disruptive discharge, and so escapes from the system, leaving the brain free from disturbance, until a fresh accumulation excites a new paroxysm." The infinite variety in the character and violence of the epileptic fits would be accounted for on this view, by variety in the quantity of the morbid material which contaminates the blood, and the different intensity with which it affects one part more than another. In support of this humoral doctrine of epilepsy he adduces the following classes of facts. 1. The influence of certain toxic agents in producing artificial epilepsy. 2. The frequent connection between epileptic convulsions and imperfect eliminatory action of the kidney. 3. The correspondence between the paroxysmal character of epilepsy and that of other diseases confessedly humoral, such as ague and gout. 4. The fact that the introduction of certain animal poisons (as those of the exanthemata or of typhus) into the system, may produce epileptic convulsions.—Of the *nature* of the morbid matter, we can at present only form somewhat vague conjectures. Of its *sources*, however, it is not difficult to frame a more definite idea; since we most frequently find epilepsy to be connected with obviously-disordered nutrition of some important organ, the most common source being the brain itself. Undue exhaustion of the nervous power by anxiety, grief, long-continued thought, masturbation, immoderate sexual intercourse, violent passions, habits of intemperance, or by a sudden shock, directly tend to impair the nutrition of the cerebral matter, and these are among the most frequent causes of epilepsy.

"No doubt, however, there may be other sources of contamination—the digestive organs, the sexual organs, the great glands—which may not only generate morbid matters capable of contaminating the blood, but may, by the imperfect performance of their functions, weaken or otherwise damage the nutrient changes of the nervous matter, so as to make it more susceptible of the influence of any noxious agent, or to cause it to generate a morbid matter."

Now upon this theory we have to remark, that it seems to us rather unnecessarily complicated. For if we understand Dr. Todd aright, the various mental and physical causes to which the epileptic condition is so frequently traceable, operate in the first instance by producing disordered nutrition of the brain; by this disordered nutrition a morbid product is generated, which contaminates the blood; and this, acting on the brain as a poison, excites the polar state, and the disruptive discharge. Or the toxic agent may be introduced into the blood, in consequence of the disordered condition of some remote organ. Now here we seem to have *two* causes assigned, when one would seem to be enough. Dr. Todd likens the brain to a galvanic battery, of which the blood is the exciting fluid; but he seems to forget that the blood is also the nutrient fluid, out of which the solid part of the battery makes itself. We seem entitled to refer the disordered function *either* to a disorder of nutrition, *or* to an abnormal condition of the exciting fluid; but it does not seem to us that *both* are necessary to account for the effects. We are accustomed to consider, in every other case, that we have sufficiently accounted for the perverted function of an organ, when we can

attribute this to abnormal nutrition ; and if it be true that the various causes enumerated by Dr. Todd *primarily* affect the nutrition of the brain, it does not seem to us requisite to suppose that, as a secondary consequence, a toxic agent is generated, which deranges its functions. The influence of disordered conditions of other organs is as likely to induce impaired nutrition of the brain by a general depravation of the blood, as to occasion irregular excitement by introducing into it a specific toxic element. On the other hand, if we believe the blood to be chiefly in fault, it does not seem to us requisite to suppose that it becomes so, in the first instance, by imperfect or perverted nutrition of the brain, even when its condition is the result of mental agencies : for every one must admit that these agencies can operate upon the blood long before they have had time to induce perverted nutrition of the brain, as we see in the immediate influence of mental emotions upon the chemical nature of the secretions. On the purely humoral hypothesis, then, the disordered state of the blood will be in all instances the immediate cause of the epileptic paroxysm ; and this may result from a great variety of causes, mental or physical, without the *nutrition* of the brain being necessarily affected.

[The reviewer proceeds to say:]

Although differing from Dr. Todd upon some points of detail, we are inclined to accept his theory as a whole, and to regard it as an important step towards a right comprehension of this very serious class of maladies. There are two forms of convulsive disease, however, to which he does not make the least allusion, and from the phenomena of which we think that he might have drawn some important inferences in support of his position ; these are, Hydrophobia and Hysteria. In *hydrophobia* we cannot but recognise a purely humoral disease. A poison is introduced into the blood, and may remain latent there for days, weeks, and months ; but when it does take effect, it is obviously by contaminating the blood, as (to use Dr. Todd's phraseology) the exciting fluid of the nervous battery, rather than as the nutrient pabulum. The mode in which the symptoms come on, and the rapidity with which they are developed after the first manifestation of them, seem distinctly to prove this. There is no reason whatever to suppose that there has been any previous perversion of nutrition ; and no morbid appearances indicate the occurrence of any recognisable changes in the nervous centres during the course of the malady. The phenomena of this disease seem to us clearly to indicate an extreme excitement of the upper portion of the automatic centres, namely, the sensory ganglia and the medulla oblongata ; this excitement having a tendency to radiate downwards, rather than upwards, so that the cerebrum remains unaffected. In fact, the extraordinary acuteness of certain sensations, and the excitement of convulsive movements by those of the *special* kind, whilst the intellectual powers remain completely undisturbed, which are the characteristic signs of this terrible disease, appear to us almost inexplicable on Dr. Todd's doctrine that the cerebrum is the seat of sensation as well as of intellectual operations, whilst it does not give off any motor nerves. On the other hand, these phenomena harmonise beautifully with the

notion, that the sensory ganglia constitute the highest portion of the automatic apparatus ; that the convulsive movements directly proceed from them ; and that they may be excited by the stimulus of a sensation directly derived from an organ of sense, or by that of an idea or remembered sensation transmitted downwards from the cerebrum. We can scarcely imagine that the idea of the humoral nature of hydrophobia has escaped Dr. Todd's mind ; and we presume that he either thought that every one else must be familiar with it (in which case he neglected to avail himself of a powerful argument from analogy), or that he felt himself obliged to exclude it by the limitation of his course to three lectures.

All the arguments which Dr. Todd has drawn in support of the humoral origin of chorea, tetanus, and epilepsy, from the absence of structural lesions, and the influence of causes affecting the general state of nutrition, tells with yet greater force upon the *hysterical* forms of convulsion—those strange manifestations of disordered excitement of the nervous centres, which baffle the sagacity of the best pathologist to account for satisfactorily, and that of the most skilful practitioner to cure. It is well known that chorea, tetanus, epilepsy, and paralysis, may occur as symptoms merely of the general hysteric condition ; and the absence of any structural lesion, or even of any seriously-disordered nutrition of the parts of the nervous centres which are the sources of the actions in question, is proved by the length of time during which the severest forms of them may exist without permanently serious consequences, and by the suddenness with which the several forms of them give place one to another, or pass off altogether. The strange combinations, moreover, which they occasionally present, remarkably distinguish them from the more settled forms of the diseases which they simulate. Thus we have known an obstinate case of this kind, in which at one time attacks of the most complete opisthotonos coexisted with perfect insensibility ; at another time the insensibility recurred alone ; then, again, there was trismus, lasting for five consecutive days, without any other spasmodic action or loss of sensibility ; this sometimes alternated with fits of yawning, in which the jaw was held open for half an hour or more ; at another period the convulsions had more of the epileptic character, the face being distorted and the limbs agitated, concurrently with insensibility, but without laryngismus ; and with this alternated fits of laryngismus without insensibility, and occurring during the *expiratory* movement ; whilst during the whole of this succession there was paralysis of the extensor muscles of the lower extremities, with paroxysms of the most violent and prolonged cramp in one of them. We do not remember to have heard or read of a stranger variety of spasmodic actions than this, as occurring in the same individual : the mental phenomena were almost equally strange ; a state of almost maniacal excitement often suddenly coming on, and ceasing as suddenly ; and every form of double consciousness, from simple sleep-waking, to an alternation of two very similar states of mental existence, developing itself at one period after the same fashion.

We have not been able to imagine any other rational explanation of such symptoms, than a disordered condition of the blood, the exciting

fluid of the nervous battery; and although we usually find that toxic agents affecting the nervous system are restricted in their action to one or another division of the cerebro-spinal centres, yet it is not difficult to suppose that some kind of morbific matter may affect *any* part to which it may be specially determined; in fact, considering the similarity in structure and in chemical character between different parts of the nervous centres, the wonder is rather that strychnia should fix so exclusively upon one, hydrocyanic acid upon another, and so on. The clnical history of hysteric convulsion, then, would lead us to imagine that it results from the existence of some morbid matter in the blood, capable of exciting undue and irregular activity of all parts of the nervous centres, but not tending to produce a permanent disorder of their nutrition. Now if we look for the source of this morbid matter, we seem to be directed by the other symptoms towards the sexual apparatus; for although we are not, perhaps, justified in saying that a disorder of the nutritive or secretory functions of this part is essential to the production of the hysteric condition, yet we believe that in all the severest forms of it, the ovarian or uterine functions are imperfectly performed, and that the restoration of their healthful activity is a main point in its cure. Even where mental emotions appear to be the immediate cause of the affection, these emotions are of a nature to affect the due performance of the reproductive functions; and it is well known that the favourable excitement of these same emotions is one of the most valuable means of cure, when it can be judiciously brought about. In the case to which we just now alluded, it was clear that the disorder originated in the disappointment of affections long cherished in secret, although it was doubtless aggravated by anxiety and over exertion of the intellect; and the influence of a very determined will, in keeping off for a time its first access, was equally apparent. The malady resisted every kind of treatment for more than four years; the catamenial discharge remaining very scanty during the whole of that time, and sometimes being absent altogether; and the recurrence of the period being almost invariably marked by an aggravation of the spasmodic attacks, and frequently by pains resembling those of the first stage of labour. A slow and almost imperceptible improvement was taking place, when circumstances occurred to give a new turn to the feelings; a new attachment was formed, which was happily reciprocated; and from that time the cure rapidly advanced, the convulsive and paraplegic affections being speedily recovered from, and nothing being left but dysmenorrhœa, which we have since had reason to regard as dependent upon mechanical causes. It is worthy of notice, that in this case there was an hereditary predisposition to gout, which seemed once to manifest itself in a peculiar affection of the tissues about the wrist-joint, of a character more gouty than rheumatic; in this respect confirming the views advanced by Dr. Laycock, in his work on the 'Nervous Diseases of Women,' as to the connexion between gout and hysteria.

It is due to Dr. Laycock, also that we should state that he distinctly advocated, in the work just referred to, the doctrine of the humoral origin, not merely of hysterical, but of many other forms of convulsive disease, to which he gave the significant term *neurœmic*. We do not

know how far Dr. Todd regards himself as original in the enunciation of this doctrine; but we judge from his exposition of it, that he is scarcely aware of the extent to which he has been anticipated by Dr. Laycock. We make these remarks in no captious spirit, but simply because we think it right that in bringing the probability of the humoral origin of convulsive diseases prominently under the notice of our readers, we should not omit to point out that the doctrine was originally promulgated by a sagacious inquirer, at a time when the humoral pathology was not quite so fashionable as it has since become.—*Brit. and For. Med.-Chirurg. Review, Jan.* 1850, *p.* 28.

12.—ON THE PATHOLOGY OF HEMIPLEGIA.

By Dr. W. W. Gull.

[Dr. Gull lays down the following proposition on this subject:—]

"If there be disorganization of the hemisphere, whether affecting the anterior or posterior lobe, and implicating the optic thalamus, or corpus striatum, singly or equally, and if the lesion be of such an extent as to produce hemiplegia, *there will be a greater affection of the upper than of the lower extremity, and a greater loss of motion than of sensation;* and if the lesion has been sudden, and both the upper and lower extremities are completely paralyzed, the leg will begin to improve before the arm, and the muscles nearest the trunk will regain their power first, that is, the deltoid and flexors of the elbow before the muscles which move the fingers. As regards sensation, it is sometimes abolished, as the intelligence also is for a few days following the attack, if the lesion has been sudden, but is soon recovered from; the mode of its restoration being, like the recovery of muscular power, *first in parts nearest the trunk,* the first in the leg."

Dr. Gull then goes on to assert, that the *seventh* nerve is subject, like the spinal nerves, to the law of "crossed" action; and that it is usually somewhat affected, though commonly to a less extent than nerves of the trunk. Now, if his opinions are here correctly reported, we cannot regard them as correctly formed. For our own observation entirely accords with the statement of Burdach, that, although the facial paralysis is more commonly "crossed," like that of the body, yet that the exceptions are too frequent to allow this to be stated as a rule. According to Burdach, out of 38 cases of cerebral lesion of one side, the muscles of the face were paralysed in 28 on the opposite side, in 10 on the same side.—So, again, Dr. Gull asserts that the *third* nerve is an exception to the law of decussating effects, and he gives in his First Lecture an elaborate apology for its being so; yet Burdach affirms that paralysis of the eyelid was in 6 cases on the same side with the lesion, in 5 on the opposite,—paralysis in the muscles of the eyeball in 8 cases on the same side, in 4 on the opposite,—and paralysis of the iris in 5 cases on the same side, and in 5 on the opposite. Dr. Gull states that the facts which have fallen beneath his own observation may be reduced to the following expression:

1. Pupil largest on the side of the disease, vision being lost.
2. Eyes turned from the paralysed side.

3. Ptosis on the side opposite to the paralysis of the extremities and face.

4. Though no obvious affection of the iris or recti may exist, yet a patient may turn his eyes most readily from the affected side, and open the eye widest on the side of the paralysis.

Hence he concludes, that when the third nerve is affected, either slightly or considerably, in ordinary hemiplegia, it is the nerve of the *same* side with the lesion that suffers; whilst the paralysis of the facial and of the spinal nerves is *crossed*. Before such a rule can be established, however, it seems to us that a much larger collection of observations should be made, than Dr. Gull has been able to adduce; and that more than ordinary care should be taken in making such observations.—*Brit. and For. Medico-Chirurg. Review, Jan.* 1850, *p.* 44.

13.—*On the Pathology of Paraplegia.* By Dr. W. W. Gull.—[The following abstract of Dr. Gull's observations, is from the British and Foreign Medico-Chirurgical Review.]

Dr. Gull's inquiries lead him to distinguish three forms of paraplegia, each dependent upon a lesion of a different kind, and each distinguished by symptoms of its own. The first of these is *paraplegia resulting from lesion of the cord;* and he affirms in regard to this, that general paralysis of the parts below the injury may equally proceed from it, whether the lesion be confined either to the anterior or posterior columns, or extend through the entire substance of the cord; and that in either of these cases *there is greater loss of motion than of sensation,* the sensation being frequently little if at all impaired, whilst the loss of motor power is complete,—which he considers to be almost invariably diagnostic of the spinal origin of paraplegia. In proof of this position, he cites a variety of examples of injury and disease of the cord, in which the symptoms have been carefully narrated during life; including the well-known cases of Dr. Webster and Mr. Stanley, one related by Dr. W. Budd, and others recorded or quoted by Dr. Abercrombie; and he affirms, that after an attentive search, he cannot find any cases of uncomplicated pressure or disorganization of the cord, in which the loss of sensation preponderated, or in which there was simple loss of sensation. Dr. Gull adds the following as the confirmatory result of his own observations:

"My attention has now for years been much given to *post-mortem* appearances; but I have not met with cases which controvert my position, nor are there amongst the numerous cases of lesion of the cord which are contained in the records of this Hospital, any which show that one part or column of the cord, when affected, is attended with anæsthesia without loss of motion, though, as we have seen, the reverse often happens."

Dr. Gull remarks, however, that in paraplegia from disease about the spine, the nerves are not unfrequently implicated, near their junction with the cord; and thus we find, on a post-mortem examination, sufficient explanation of what, carelessly observed, might seem to destroy the validity of the distinction just laid down. Thus in the case of Count de

Lordat, cited by Dr. Abercrombie, a paralytic affection of the left arm followed an injury to the neck from a fall, and the opposite arm became numb. On a post-mortem examination, however, there was found, not only induration of the cord, but a compact and tendinous condition of the spinal nerves, owing to a thickening of their investing membranes; such as was quite sufficient in itself to account for the anæsthesia.

Pursuing his inquiry, Dr. Gull next calls attention to those cases of paraplegia in which *the loss of sensation is greater than that of motion;* and these, he remarks, so far from being anomalous or contradictory to the preceding, naturally arrange themselves into two distinct groups, according to the seat of the lesion, which may be either *peripheral,* affecting the nerve-trunks in their course, or *central,* in which case it is encephalic instead of spinal. The former of these groups, constituting Dr. Gull's *second* class of paraplegic diseases,—those, namely, *with preponderating anæsthesia, arising from peripheral causes,*—has been especially noticed by Dr. Graves, who quotes, as one of the most remarkable examples of such peripheral affections, the *Epidémie de Paris* in the spring of 1828, which has been minutely described by Chomel, and which was witnessed and studied by Dr. Graves himself. This curious affection usually began with an extraordinary *exaltation* of the general sensibility, which gave place after a few days or even hours to a general *diminution* of sensibility, and this even proceeded to the extent of complete *abolition.* The power of motion also declined, but usually in a less degree, and rather subsequently to the loss of sensation than synchronously with it. In most instances recovery took place, though the paralysis was very capricious, vanishing and again reappearing. In some cases, however, the disease went on to a fatal termination; and no lesion whatever of the nervous centres was discoverable. The symptoms were evidently referable to some general cause affecting the nutrition of the nerve-trunks in general; and the malady had all the characters of a disease induced by the presence of some poisonous agent in the blood.—A case is related by Dr. Gull as having occurred in Guy's Hospital, in which a general numbness of the lower extremities, clearly traceable in the first instance to exposure to cold and damp, continued without any muscular weakness for seventeen years; after which under a repetition of the cause, the numbness extended to the upper extremities, and the power of motion became affected. Symptoms of ramollissement of the cord then supervened, and the patient died; no post-mortem examination was made; but the history of the case affords unmistakeable evidence that the affection was here at first entirely peripheral. He cites another case of the same kind, narrated by Dr. Graves; and adverts to the well-known influence of cold upon the nerves even of parts far removed from the seat of its direct application, as in sciatica from standing on cold stones. Such peripheral affections of the nervous system may be the source of paraplegia; but we scarcely think that he has as yet collected sufficient evidence, that the disturbance of sensibility in such cases is *always* antecedent to that of motor power.

Having thus shown that cases of paraplegia, with prevailing numbness, may arise from causes acting on the nerves themselves, Dr. Gull calls attention in the next place to a third class of paraplegic diseases,

resulting from anxiety, mental depression, irregular practices, &c., which are attended with general diminution of the nervous, and especially of the encephalic force; in these also, there is a greater proportional impairment of sensation than in spinal affections, as was pointed out by Mr. Earle, in his valuable paper on Paraplegia; and the impairment of the power of voluntary motion is often in a great degree attributable rather to the want of the guiding influence of sensation, than to any direct loss of motor power. The gait of such persons, as remarked by Mr. Earle, is very much that of a drunken man; and where the anæsthesia is complete, they are obliged to employ the visual sense as a substitute for the muscular. Thus, says Dr. Gull, "one patient told me he could not walk without looking at his feet, because he felt as if his legs were cut off below the knees; and another, because he had no apparent weight." The peculiar state of the sensation was especially noticed by Mr. Earle, who described it as imparting to the patient the idea of some foreign body, as a glove or stocking, being interposed between the object and the skin. With the numbness, there is yet the perception of pricking or pinching of the integuments; and the numbness generally terminates in an undefined manner about the elbows, and just above, or at the knees. There are frequently, moreover, affections of the special senses, as flashes of light, muscæ volitantes, dimness of vision, and noises in the ear; and one peculiarity noticed by Dr. Gull is, that the most moderate pressure on the nerves, as from lying on the arm in bed, or sitting upon the edge of a chair, will very speedily render the nerve completely anæsthetic. That the seat of this affection is encephalic, rather than spinal or peripheral, appears scarcely questionable; and that its cause is rather a disordered state of the general nutrition, than any special local lesion, such as may sometimes be discovered after death, appears equally probable.

In paraplegic affections, then, in which anæsthesia prevails over loss of power, we must not expect (according to Dr. Gull) to find a local and circumscribed lesion of the spinal cord; but we must examine whether there be any probability of diseased action in the peripheral portion of the nervous system, or whether there are indications of the encephalic origin of the disorder. Between these two, the history of the case will seldom leave us much difficulty in deciding.—There is another form of paraplegia, however, of which several cases have been recorded, and of which five examples have fallen under Dr. Gull's own notice; this, to which he gives the designation of *cervical paraplegia*, particularly manifests itself in the upper extremities, the legs being sometimes not in any degree affected, whilst they are always much less so than the arms. The muscles of the shoulder and upper arm are at first implicated, and often alone affected. The disease may begin in both extremities at the same time; or, having begun on one side, may gradually pass across and affect the other. At the onset there may be pain and soreness of the muscles; but after the disease has existed for some time, there is no obvious modification of the sensation. From a careful comparison of the phenomena, Dr. Gull comes to the conclusion, in which we believe him to be perfectly justified by the evidence he adduces, that the disease commences in the *muscular* structure, and that the affection of the nerves is secondary.—*Brit. and For. Medico-Chirurg. Review, Jan.* 1850, *p.* 39.

14.—*On Movements of Rotation caused by tearing the Facial Nerve.* By M. Brown-Sequard.—If the facial nerve of a rabbit or guinea-pig be exposed at its exit from the stylomastoid foramen, and be then drawn away from the cranium, so as to tear it asunder near its origin, the animal begins in about five minutes to turn itself round and round; the movement being from left to right when the nerve has been thus torn on the left side, and from right to left when it has been torn on the right side. This rotation is generally preceded by convulsive movements of the eyes, of the jaws, and of the head upon the trunk; and the body is then bent (as in pleurosthotonos) towards the injured side, by the contraction of all the longitudinal muscles of that side, the power of which is such as to resist considerable force applied to extend them. The movement at first takes place within a small circle; but the circle gradually enlarges more and more, until at last, after twenty or thirty minutes, the animal walks in a straight line. There is no paralysis of any muscles, save the facial. The effect is not produced, unless the nerve be torn close to its origin. In dogs, it almost invariably separates in its course through the aqueduct of Fallopius, and the experiment does not succeed. In rabbits it is usually successful; in guinea-pigs almost invariably.—When the nerve on the other side also is torn, even after a long interval, instead of the tendency to turn to one side, we see at first a *rolling* of the body on its longitudinal axis, which takes place towards the side last operated on. After this has continued, however, for twenty minutes or more, the animal recovers its feet, and begins to *turn*, as after the first operation, but towards the other side. This movement soon ceases. The turning movement resembles that which results from injury of the medulla oblongata a little in front of the calamus, but takes place in the contrary direction; and the movements produced by the latter method commence at once, and do not cease of themselves like those produced by the tearing of the facial nerve, which obviously acts by producing a temporary *irritation* only.—*Gazette Médicale.—Brit. and For. Med.-Chir. Review, Jan.* 1850, *p.* 249.

15.—ON FATTY DEGENERATION OF THE SMALL VESSELS OF THE BRAIN, AND ITS RELATION TO APOPLEXY.

By James Paget, Esq.

[The following paper, Mr. Paget tells us, was recently communicated by him to the Abernethian Society at St. Bartholomew's Hospital:]

In the least degrees of the disease which I propose to describe, the only apparent change of structure is, that minute, shining, black-edged particles, like molecules of oil, are thinly and irregularly scattered beneath the outer surface of the small blood-vessels of the brain. Such a change may be seen in the vessels of portions of the brain that appear quite healthy, as well in the capillaries as in branches of both arteries and veins of all sizes, from 1-150th of an inch in diameter, to those of smallest dimension.

As the disease makes progress, the oil-particles may increase in number till the whole extent of the affected vessels is thick-set with them, and the natural structures, even if not quite wasted, can hardly be discerned. While their number thus increases, there is, also, usually, a considerable increase of the size of many of the oil-particles, and they may be seen of every size, from an immeasurable minuteness to the diameter of 1-2000th of an inch. In other places, one sees, instead of this increase of scattered oil-particles, or together with it, groups or clusters of similar minute particles, which are conglomerated, sometimes in regular oval or round masses, like large granule cells, but more often in irregular masses or patches in the wall of a great part of the circumference of a blood-vessel.

In a single fortunately selected specimen, one may see, in different branches of a vessel, all these degrees or states of the disease, the less and the more thickly scattered minute oil-particles, the clusters of such particles in various sizes and shapes, and the larger particles like drops of oil.

When the fatty degeneration has made much progress, changes in the structure, and, not rarely, changes in the shape also, of the affected blood-vessels may be observed. The chief change of structure appears to consist in a gradual wasting of the more developed proper structures of the vessels : growing fainter in, apparently, the same proportion as the disease makes progress, the various nuclei or fibres are at length altogether lost, and blood-vessels of even 1-150th of an inch in diameter appear like tubes of homogeneous pellucid membrane, thick-set with the fatty particles. The structures of the vessels are not merely obscured by the abnormal deposits : they waste and totally disappear.

The changes of shape which the vessels may at the same time undergo are various. Very commonly, the outer layer of the wall is lifted up by one or more clusters of oil-particles, and the outline of the vessel appears uneven, as if it were tuberous or knotted. Sometimes the outer or cellular coat of the vessels is for some distance raised far from the middle coat, as if it were inflated, and the space between them contains numerous particles of oil ; (but, perhaps this raising up of the outer coat is often produced by water being imbibed while preparing the specimen for examination). Sometimes, but I think only in vessels of less than 1-500th of an inch in diameter, partial enlargements, like aneurismal dilatations or pouches of their walls, are found.

The vessels most liable to this disease are, I think, the arteries of about 1-300 of an inch in diameter ; but it exists, generally, at the same time, in the veins of the same or of less size. As a general rule (judging from the specimens hitherto examined), the disease decreases in nearly the same proportion as the size of the vessels, and the smallest capillaries are least, if at all, affected. But there are many exceptions to this rule ; and it is not rare to find vessels of from 1-2000th to 1-3000th of an inch in diameter, having parts of their walls nearly covered with the abnormal deposits.

The principal and first seat of the deposits is, in arteries, in the more or less developed muscular or transversely fibrous coat :—in veins, it is in the corresponding layer, immediately within their external fibro-

cellular nucleated coat: in vessels, whether arteries or veins, whose walls consist of only a simple pellucid membrane bearing nuclei, the substance of this membrane is the first seat of the deposits. In some cases the outer fibro-cellular coat of both arteries and veins appears to contain abundant fatty matter. But it is seldom that, in an advanced stage of the affection, any of the several coats of a blood-vessel can be assigned as its chief seat; for even in large four-coated arteries they wholly waste, and their remains appear united in a single pellucid layer, of which the whole thickness may be occupied by the deposit.

The figures represent some of the most usual appearances of the degeneration.

Fig. 1. An artery, of 1-300 of an inch in diameter, and a branch given from it, from the softened corpus striatum in the third of the related cases. Numerous oil-particles of various sizes are scattered in the muscular coat, traces of the tissue of which appear in obscure transverse marks.

Fig. 2. From the same part, a vein 1-600th of an inch in diameter, with branches from 1-1200th to 1-1800th, and portions of capillaries. Scattered oil-particles, and groups, like broken irregular granule-cells, are seen in the homogeneous pellucid walls of all the vessels.

Fig. 3. A vessel of 1-600th of an inch in diameter, and another of 1-1800th, with a branch of 1-3000th of an inch. Groups and scattered oil-particles are thick-set in the simple, pellucid, membranous walls. From the second of the related cases.

The changes of structure just described indicate an affection of the small blood-vessels similar in its nature to those which form the large class of "fatty degenerations."

In such cases, when the disease is far advanced in any of the blood-vessels, the loss of their proper structures, and the weakening of the remains of their walls by the copious deposits of fatty matter in them, must make them peculiarly liable to rupture. It cannot but be that this affection should constitute a predisposition to apoplexy, whether occurring in its simplest form or in connection with cerebral softening; indeed, how readily vessels thus affected may be torn, we may see in the

frequency with which, in the microscopic examinations of them, specimens of considerable blood-vessels are found torn across at or near the abnormal deposits.

It may assist future researches if I add a short notice of the principal observations that have been lately made on the diseases of the small blood-vessels.

With the exception of the notices of the general dilatation of the small vessels of inflamed parts, scarcely any facts had been recorded in relation to this subject, till Kölliker and Hasse published their observations on the occurrence of "aneurismal capillaries," in a case of acute inflammatory softening of the brain, with capillary apoplexy. This affection, consisting, as the name implies, in partial pouch-like dilatations of the walls of small blood-vessels in inflamed parts, was subsequently observed by them in inflammations produced by severe injuries of the brains of rabbits. Bruch detected a similar condition of the small arteries in a case of traumatic inflammation of the peritoneum of a bitch; and Harting, in a case of diseased ovary. More lately, two cases have been described by Kölliker, and one by Rinecker, in which such aneurismal dilatations existed in the vessels of softened portions of the brain; but, in all these cases the dilatations affected, not the smallest capillaries, but those of largest size and the small veins. In all these cases, also, small blood-red points, characteristic of the so-called capillary apoplexy, and usually ascribed to effusions of blood, were found to be the aneurismally dilated vessels full of blood.

I lately observed this kind of dilatation in a case of acute softening of the brain, and could confirm all that Kölliker has described of it; but it existed in comparatively few of the blood-vessels of the diseased part. I have mentioned it, also, as occurring among the vessels of the brain in the second of the cases recorded; and Dr. Ormerod tells me that he observed "fatty degeneration, with irregularly formed vessels and lateral expansions," in the neighbourhood of a large collection of pus in the brain. Doubtless, such partial dilatations are very frequent, if not constant, in cases of cerebral softening; but it has yet to be determined whether they are characteristic of inflammation, or whether, as I suspect, they may occur as well in the vessels weakened by fatty degeneration.

Kölliker has recently described a disease, which he names "spurious aneurisms of the smallest arteries of the brain." It consists in effusions of blood between the middle and internal coats of arteries, from one-third of a line in diameter to those of smallest size: effusions resembling those of "dissecting aneurisms." He says this is "according to my observations hitherto, the regular forerunner and accompaniment of common and capillary apoplexies." I have too much confidence in the accuracy of Prof. Kölliker to doubt his observations; and though I have seldom, and only obscurely, seen what he describes and figures in his Tab. xix., fig. 1, yet I believe that these effusions of blood in the coats of the smallest arteries may be usual in cases of apoplexy. But I believe, also, that such effusions will be found to be only one of the consequences of previous degeneration of the arterial walls. Without such degeneration, neither the partial rupture of the vessels producing spurious

aneurisms, nor the complete rupture permitting the effusion of an apoplexy, is likely to happen.

Respecting fatty degeneration in the small blood-vessels, the only notice I can find is by Virchow, who says he has seen glistening red or yellowish little fat-drops in the epithelial cells of the capillary vessels of the kidney. This, however, must be quite a different affection from that which I have described, and in which the fatty degeneration is seated in the muscular or other corresponding coat of blood-vessels, that, so far as I have observed, have no epithelium. So, too, it is a different, though it may be a related affection, which Rokitansky describes as consisting in the excessive deposit of internal coat in very fine arteries, making their walls thicker, turbid, less transparent and brittle. This affection is well known in the bloodvessels of the brain just visible to the naked eye: it occurs, too, in those of the uterus, mammary gland, and perhaps many other organs in process of senile atrophy. Rokitansky "believes also that he has convinced himself of a similar state in the proper capillary vessels."

It will be observed, that nearly all the observations hitherto made relate to the bloodvessels of the brain. The facility with which those can be separated and cleaned for microscopic examination may explain this: but it is not likely that the brain should be the only organ whose small vessels are liable to these affections.—*Med. Gazette, Feb.* 8, 1850, *p.* 229.

16.—ON THE DIFFERENT TYPES OF DELIRIUM TREMENS, AND THEIR TREATMENT.

By Dr. James Bird, A.M., London.

The most usual divisions of this disease have been into two species; the one succeeding the excitement of hard drinking, without any intermediate abstinence from the accustomed stimulus; the other, attacking habitual drunkards soon after the accustomed stimulus had been withdrawn. The former may be considered as a state of *hyperœsthesia*, and increased vascular action in the nervous centres, or in the remote organs acting on them; the other, a state of *hypœsthesia*, or exhausted nervous sensibility, and diminished vascular action of the capillaries, more nearly akin to congestion than inflammation. Dr. Stokes, of Dublin, thinks that the pathological condition of the former consists of gastritis, accompanied by excitement of the brain and nervous system; and recommends that its treatment should be that of gastritis: but that in the other case, the functions of the brain are disturbed, by the abstraction of an accustomed stimulus, and that the appropriate treatment must be to restore that stimulus, and administer porter, wine, brandy, and opium.

[Dr. Bird, classifies the modifications of delirium tremens under four forms, *simple, inflammatory, pyrexial, and epileptic;* and gives a description of the disease generally and of these varieties, from which the following extracts are taken:]

It is difficult to give any true or concise description of delirium tremens. It may, however, be thus defined.

DEF. *A disease which manifests itself, after hard drinking, or the long continued and free use of narcotico-stimulant substances; and is characterized by insomnia, exalted sensorial function, rapidity of thought, mental hallucination or illusions of sense, tremor of the tongue or limbs; delirium occasionally associated with inflammation or fever, a cold clammy perspirable state of the cutaneous surface, seldom recovered from without a critical sleep, and prone, in its worst forms, to terminate in coma.*

Modified Forms. 1. *Simple.* This must be considered as the purely nervous variety, depending on mere erethism of the system, either of centric or peripheral origin, which runs a certain course, and has a tendency to subside of itself in a given time.

DEF. *It is marked by insomnia; busy mental excitement and loquacity; psychical hallucination or incoherent muttering; illusions of sense; timid suspicion of imagined conspirators; tremor of the tongue or hands; hepatic erethism or irritability of stomach; impaired urinary function; occasional headache and precordial anxiety; tongue sometimes clean, at others loaded; pulse frequent, irritable, sometimes natural; a perspirable state of the skin, and pain of the limbs: the disease varying by the occasional absence of mental incoherence or tremor.*

2. *Inflammatory.* This is the next form of the disease with which we meet in the tropics. It is one marked by a greater degree of vascular determination to the brain and its connexions, or to some of the remote organs, either the stomach or lungs, which may act sympathetically on the nervous centres.

DEF. *Characterised by great restlessness and impatience of manner; maniacal violence, and busy psychical hallucination or muttering delirium; flushing of the countenance, heat of head, and contracted pupils; convulsive twitching of the muscles, heat or pain at the epigastrium; a frequent, full, or hard pulse; generally a dry hot skin, but sometimes a cool, perspirable, cutaneous surface; a dry, red, parched tongue; and much thirst.*

The transition from simple erethism, or disturbed sensation, accompanied by a slight degree of derangement in the capillary circulation of the brain, or peripheral organs, to a higher degree of nervous irritation and increased vascular action, constituting an inflammatory state of either the nervous centres or their peripheries, must be viewed as an important ground of distinction in the various phases of the same disease.

It is important in all inflammatory affections of the brain, and of its subordinate nervous centres, to determine whether nervous or vascular derangement has the precedence; for on the predominance of one or the other, the treatment must be regulated. The primary assimilation of individuals attacked by delirium tremens, will be generally found defective previous to the occurrence of the attack; and as the processes of nutrition, both in the nervous and vascular systems, have been imperfectly performed, it is necessary to keep in mind, that inanition, and other predisposing causes of the disease, are debilitating ones, which give to the inflammation set up, a character of exhausted constitutional power, strongly disposed to pass into suspended functional action of the nervous centres, by terminating in coma, apoplexy, and cerebral effusion. If the

attack has been preceded by long-continued habits of intoxication or great mental excitement, this state of innervation and exhausted power will be more apparent in particular symptoms, as the low, muttering character of the delirium ; the anxiety of the respiration ; the frequency, feebleness, and irritability of the pulse ; the pallor of the countenance ; the cold and clammy moisture of the cutaneous surface, and the dryness of the tongue. Every increased action and excitement of the nervous centres involves, as would appear, a disintegration of their substance, and corresponding demand of reparation, without which, immediate suspension of their functional operations must follow. Attention to this law of the constitution will be found of great importance, as ground for the modified treatment of this disease.

3. *Pyrexial.* The third form of the complaint, which occurs more generally in the malarious seasons of the year, from July to October, is frequently met with, during the other months, in constitutions rendered irritable by long residence in warm climates, or in persons previously subject to intermittent and remittent fevers.

DEF. *It is accompanied by wakefulness, anxiety, and restlessness ; following a stage of depression, chilliness, or shivering ; succeeded by febrile heat of skin, or cold, clammy perspiration ; tremor, muttering delirium, and illusions of sense ; frequent sighing ; rapid, irritable pulse ; furred tongue ; scanty urinary secretion ; complicated with inflammation and pyrexial paroxysms, and prone to terminate in collapse or epilepsy.*

Most of such cases might be viewed as forms of irregular remittent fever, which, accompanied by irritability of the sensorium and nerves, are apt to terminate in suspension of the nervous functions. Among recently arrived Europeans, during the hot weather in India, this form is met with as the product of elevated temperature and excessive spirit-drinking, and assumes many of the characters of an inflammatory remittant, in which accelerated vascular action has predominance over nervous erethism. In the *asthenic* modification of it, however, the vertigo, dilated pupil, oppressed and weak pulse, and other symptoms of depressed nervous energy, (which characterize cases of Delirium Tremens), with a well marked tendency to syncope and feeble action of the heart, point it out as a disease of innervation. Modifications of this variety in debilitated constitutions, rendered irritable by long residence within the tropics, are also frequently met with during the cold months. In a practical point of view, it is useful to arrange such cases as modifications of delirium tremens ; for though, with equal propriety, they might be classified as varieties of remittent fever, they should be separated in the mind of the physician, from more pure remittent fevers, caused chiefly by malarious influence.

4. *Epileptic.* This is the fourth and last form of the disease.

DEF. *Insomnia ; psychical hallucination, or illusions of sense ; extreme tremor ; and sometimes convulsive twitching of the muscles, passing into sudden loss of consciousness and sensation, accompanied by clonic spasms of the muscles, recurring in paroxysms, which terminate in recovery of consciousness and sensation, or in apoplectic annihilation of the cerebral functions.*

[Passing over, from want of space, Dr. Bird's account of the differential diagnosis and pathology of these forms of disease, we come to the *Treatment.* Upon this subject Dr. Bird says :]

The indications of judicious treatment must be founded on a correct diagnosis of particular cases, and on a sound knowledge of the existing pathological conditions associated with the morbid phenomena. Such can be alone obtained from a strict pathological analysis of the symptoms, combined with a knowledge of the previous habits of the patient. It should not be too hastily inferred, that the sole and leading indication of the treatment must be to induce sleep by heroic doses of opium ; for this, when given too largely in order to cut short the exalted sensibility of the brain, without reference to the conditions of other remote organs, particularly the liver and kidneys, is fraught with much danger to the patients, by causing convulsions, coma, and death. Dr. Ware's two admirable memoirs on the 'Natural History and Treatment of Delirium Tremens,' are most important contributions to a philosophical knowledge of the disease ; and the conclusions arrived at are essential elements in our comprehension of its true pathology and treatment. The paroxysm of the disease commences with certain obscure signs of depression, followed by excitement and delirium, which run a certain course, and terminate in sleep. This may be considered as much sequent of the stage of excitement, as is the secondary delirium to the stage of coma in cases of poisoning by stramonium. As a favourable termination of the symptoms generally follows a sound sleep, it has been concluded, somewhat erroneously, that sleep, induced by whatever means, is the cause of the salutary change which takes place, and by which the patient is relieved from excitement, and restored to reason. A profuse warm sweat may be observed to accompany this critical sleep ; but when no such crisis is observable, and sleep has been procured at all hazards by means of large doses of opium, the patient passes into a state of apoplectic coma, from which he may never awake. The excitement of the system does not altogether depend on the loss of sleep ; and we must not proceed too vigorously in endeavouring artificially to induce it by means of opium or chloroform, till the impaired secretory and excretory functions of the body have been restored to healthy exertion.

The indications of treatment to be generally acted on are : 1. To allay the exalted sensibility of the central nervous organs or their peripheries, by reducing vascular derangement and inflammation by means of mild antiphlogistic remedies, and by the removal of all irritating diseased secretions of organs that react on the brain. 2. To restore the organs of assimilation to a healthy condition, so as to supply fresh nutrient materials to the blood ; and to prevent nervous exhaustion by a moderate allowance of stimuli, combined with such materials. 3. To eliminate poisoned products from the blood, by restoring the proper excretory functions of the liver and kidneys.

In fulfilling the first indication, it will be prudent to seclude the patient in a quiet and partially darkened apartment, and let him be watched by some well instructed nurse or attendant, who is capable of

quieting his impatience, and can manage him without physical restraint. I have known many cases, in which the mental emotion and nervous exhaustion, caused by coercion, were followed by the utmost danger to the patient, by bringing on an epileptic seizure. In particular instances, where the vascular action preponderates over the nervous erethism, the cautious use of general or local bleeding is admissible ; but it must be remembered, that, though in such instances of inflammatory or pyrexial complication, blood-letting may be had recourse to, it must be used sparingly, as having a natural tendency to aggravate the nervous erethism, and those symptoms of exhaustion with which the disease is so usually associated. In most cases, therefore, the local application of ice or cold douche to the head is a preferable and safer means of subduing the cerebral sensibility and increased vascular action, which are so characteristic of this peculiar disease. The cold douche may be repeated three or four times in the day ; and frequent general cold affusion, where the temperature of the skin is not below the natural standard, the pulse is of moderate strength, and there are no local complications, is had recourse to in India with the best effect. In many cases, even where there were indications of a feeble circulation, but much cerebral excitement, I have seen the cold douche to the head used with most beneficial effects, while the rest of the patient's body was immersed in a warm bath. The water used in India, where the mean temperature is high, was never artificially cooled ; but when used in European climates, particularly in winter, it may be prudent, occasionally, to take off the extreme chill of the water before using it. In further fulfilment of this indication, the administration of tartar emetic solution, in the proportion of half a grain of the tartrate of antimony, with a drachm of the tincture of opium, and an equal quantity of nitrous ether, may be had recourse to with the greatest advantage in allaying the excitement of the brain, and in inducing a healthy secretory action of the skin and kidneys. When the biliary secretion is morbidly increased, emetics will be found of the greatest use in relieving the stomach from the irritation of unhealthy bile ; and should purgatives be thought more applicable, calomel in large doses, or combined with antimonials and opium, followed by castor oil, may be advantageously employed. Sometimes the exhibition of stimulating enemata after the calomel and opium may be preferred to purgatives, which, when used too freely, are apt to produce an increase of excitement.

The fulfilment of the second indication is to be accomplished by administering moderate quantities of thin sago or arrow-root, combined with wine or brandy, according to circumstances. From five or eight ounces of port wine in the course of twenty-four hours, with occasionally a quarter of a pint of brandy or gin, adapted to the greater or less nervous exhaustion of the patient, will be generally found sufficient to fulfil all that is here required in particular cases. Should the appetite, as is often the case, admit of more solid ingesta being used, mutton chop, grilled chicken, etc., may be given to the patient.

The third and last indication, that of removing poisoned elements from the blood, is partly effected by the latter part of the first indica-

tion of removing irritating secretions from organs that react on the brain. The special object in view, however, should be steadily promoted, by freely administering calomel, aided in its action by diuretics, in order to restore the impaired excretory functions of the liver and kidneys, and thus eliminate urea from the blood. In cases of peripheral erethism, arising from the retention of biliary matters, calomel will be found an invaluable remedy ; and Mr. Corfe's late experience of its good effects, in cases of this kind, and of deranged gastro-hepatic function, establishes the fact, that it will succeed in subduing general erethism after all other remedies have failed. The whole of my experience in India can bear testimony to its good effects, and would justify Mr. Corfe's well-grounded reliance on this as a special remedy. More might be added as to the relative value of particular remedies ; but enough has been already said practically to guide the judgment of all who may be called on to treat the disease.—*London Journal, May*, 1850, *p.* 419.

17.—ON THE PATHOLOGY OF DELIRIUM.

By Dr. R. B. Todd, F.R.S.

[The Lumleian lectures for 1850 have been devoted by Dr. Todd to a discussion of the pathology of delirium and coma, a subject which has never hitherto been fully investigated. The two conditions referred to, have usually been attributed, as Dr. Todd remarks, to various degrees of congestion of the brain, but no attempt seems to have been made to ascertain how far this supposition may be correct. Dr. Todd observes :]

Coma, in its most profound state, may be defined as a complete suspension of that mutual influence of the mind and of the organ of consciousness, in which, speaking physically and physiologically, our consciousness exists—a suspension which, no doubt, begins with the physical organ, and therefore involves the powers of thought and of perception, so that the comatose patient neither wills, nor feels, nor thinks, and he awakes from this state as from a deep sleep : he knows not where he had been, and he feels as if during a certain interval he had ceased to exist.

The state of delirium, in its highest degree, is a complete disturbance of the intellectual actions ; the thoughts are not inactive, but rather far more active than in health : they are uncontrolled, and wander from one subject to another with extraordinary rapidity ; or, taking up some single subject, they twist and turn it in every way and shape, with endless and innumerable repetitions. The thinking faculty seems to have escaped from all control and restraint, and thought after thought is engendered without any power of the patient to direct or regulate them. Sometimes they succeed each other with such velocity, that all power of perception is destroyed, and the mind, wholly engrossed with this rapid development of thoughts, is unable to perceive impressions made upon the senses ; the patient goes on unceasingly raving, apparently unconscious of what is taking place around him ; or it may be that the senses have

become more acute, and that every word dropped from a bystander, or every object presented to his vision, will become the nucleus of a new train of thought, and moreover, such may be the exaltation of his sensual perception, that subjective phenomena will arise in connection with each sense, and the patient fancies he hears voices or other sounds ; ocular spectra in various forms and shapes appear before his eyes, and excite to further rhapsodies of thought.

If, then, these states of coma and delirium involve so complete a departure from the normal condition of the consciousness and intellect, and if, as experience teaches us, they are apt, one or other, to accompany diseases of organs other than those which form part of the nervous system, surely nothing can be of higher practical moment than that our views of the pathology of these states—of the precise nature of the derangement of the physiological action of the body, which is capable of producing them in their various degrees ; I say, surely nothing can be more important, practically, than that our views upon these points should be definite and settled. Such derangements as these, affecting as they do, in the most serious manner, both consciousness and the power of thought, must lie at the very foundation of our knowledge of the derangements or diseases of the nervous system.

Can it be expected that we shall be able to form any correct idea of the effects which inflammation or other disease of the brain is capable of producing, if we know nothing of the intrinsic nature of those conditions which give rise to coma or to delirium.

Delirium occurs under such a remarkable variety of circumstances, in such various conditions of the system, that I find it impossible to give anything like a connected view of the subject without describing the several forms of it *seriatim* as we meet with them in practice, and arranging them in the following order :—

First, I shall describe what may, I think, be properly called the *epileptic delirium*. I do not think that this form of delirium is sufficiently appreciated by practical men. It seems to me be of frequent occurrence, and that in some of those instances in which, under some sudden impulse, persons are led to commit some dreadful deed, which is opposed to the whole tenor of their previous lives, it is the sudden access of epileptic delirium which has thus disturbed the balance of their moral nature.

I shall describe the phenomena of this delirium from some cases which I have witnessed. A man, hitherto healthy, fails somewhat in health, becomes dull and melancholy—takes a gloomy view of things—but still his ill health is not sufficient to prevent him from following his usual avocation, nor is it noticed by any, save perhaps those who are constantly with him. There may or may not be some cause for this—some excess—or some mental trouble or anxiety—some altered position of his affairs.

Presently, either at night or on first waking from sleep in the morning, or it may be while he is at his usual employment or business, he becomes strange and incoherent—talks at random—mistakes things and persons—writes odd letters : in short, he displays unequivocally by words and actions that the mind is disturbed.

This state of delirium may speedily end in an ordinary paroxysm of epilepsy, with all its accompaniments, after which the patient resumes his wonted health; or it may continue for a considerable time, assuming even the characters of violent mania, with sleeplessness, exciting the utmost terror among the patient's family and attendants: it may last even for days, and then the occurrence of an epileptic fit relieves all doubts as to the nature of the maniacal paroxysm.

It may be, however, that these phenomena will occur with a patient who is subject to epileptic attacks, in which case, if the fact be made known to the medical attendant, he will have the less difficulty in recognizing the true nature of the paroxysm.

And it may also happen that the delirium may pass off, or it may terminate in coma, from which the patient may waken up restored, without, in either case, the occurrence of any *convulsive* attack of epilepsy.

The delirium, in cases of this description, is in general of the most decided kind; and it often amounts to mania. The patient is wakeful, noisy, sometimes mischievous, sometimes muttering and incoherent, and unintelligible; sometimes distinct and easily understood, the subject of his ravings being determined by circumstances or events which had previously more or less occupied his mind.

This form of delirium is not accompanied by any particular constitutional disturbance; the pulse is accelerated, but not to any great extent; its range ordinarily is from 80 to 100; it exhibits no character of strength, but is often full and throbbing.

The effects of any long continuance of this delirium are to induce exhaustion, as, indeed, is the case with all forms of delirium; and patients sometimes die suddenly, even when they may seem to be on the road to recovery. Hence they require the closest attention on the part of the attendant, to prevent undue exertion.

A peculiar feature of this form of delirium is that it comes on suddenly, without previous disorder, or without warning of any kind, as the epileptic paroxysm does. A man may be in perfect health to all appearance, and within five minutes a furious and dangerous maniac. A remarkable case of this occurred to me in a medical gentleman, who was well known and much respected: he was a bachelor, about 45 years of age: he had evinced no particular symptom of illness, but suffered some degree of mental anxiety. One afternoon, having been engaged that day to dine out, he went up to his dressing room to dress, and within five minutes his housekeeper was attracted to his room by a noise, and found him sprawling on the floor in a paroxysm of mania, shouting at the highest pitch of his voice, as if he had been assaulted by thieves. This case soon proved itself to be of the epileptic kind.

I shall mention another similar case which came under my care. A respectable, well-conducted man, about 35 years old, became, without any assignable cause, delirious at night. It was distinctly ascertained that he had not been drinking, nor had he been overworked; but his wife thought he had been depressed and dull for the three or four days before the attack. A neighbouring medical man bled him moderately, but without effect upon the delirium. He was brought to King's College

Hospital in a state almost maniacal, and it was thought necessary to restrain him by the strait-waistcoat. When I saw him on the following day, I viewed the case as likely to prove of the epileptic kind. I removed all restraint, and, although much pressed to adopt an opposite line of treatment, I gave stimulants and opium. Under this treatment the delirium greatly subsided, and on the following day the patient had a severe epileptic fit, which was followed on subsequent days by several others.

A third case is as follows:—A man, aged 24, a tailor, temperate in his habits, and previously healthy, has had a hesitation in his speech since his childhood. On the 10th of May, whilst at work, he was seized with giddiness and confusion of ideas. He ran out of the house in which he worked, and, without knowing what he did, ran up and down the street, talking strangely. He continued in this state for a quarter of an hour, and then came to himself, feeling for some time afterwards depressed and shivering, with a mistiness before his eyes.

Next day he was attacked again with the same symptoms, but in a less degree, and he was admitted into the hospital, where, under a course of purgatives and a regulated diet, there was no return of the attack.

A country carman was walking alongside of his horse through the streets in the neighbourhood of King's College Hospital, when he was observed by the policeman on duty to look bewildered, and to be unconscious of where he was going: he gave incoherent answers, and was evidently quite astray in his mind. On the policeman interfering to bring him to the hospital, he resisted with violence, and became quite furious. In this state he was admitted, and it was found necessary to restrain him: he continued violently delirious for about twenty-four hours, and then fell into a comatose sleep, from which he recovered in twenty-four hours more, without any other treatment than shaving the head and keeping it cool, and the use of purgatives by enema and afterwards by the mouth. When this man recovered, we learned that he had never had any similar attack previously, nor was there any evidence of intemperance.

I am frequently in the habit of seeing a pale delicate lad, with large head, who about once in three months, whilst at work, is seized suddenly with giddiness and confusion of thought, followed by a delirious state, in which he talks incoherently, and his pupils become largely dilated; the delirium passes into a state of stupor and drowsiness, and considerable weakness. Purgatives and tonics appear to exercise a beneficial influence upon him, and while he perseveres in the use of steel and quinine, the intervals between the attacks are lengthened.

When delirium occurs with patients subject to epileptic fits, it precedes or follows the paroxysm, or both precedes and follows it for very variable times. Sometimes the delirium ushers in the fit, and the patient is violently maniacal for some time previously; at others, the patient comes out of the fit in this state, which lasts a longer or shorter time, the duration of the delirium varying in both cases from some hours to several days.

The frequent repetition of the attacks in this form of delirium kills by exhaustion; or a single attack, if of sufficiently long duration, may kill in the same way; or the patient may die in, or immediately after,

the epileptic paroxysm ; but in all cases the immediate cause of death seems to be a state of exhaustion induced by the violent exertion of the patient either in the delirium or in the epileptic paroxysm, or more rarely a state of depression accompanying the invasion of the delirium ; or, in cases where there is no violence nor any convulsion, as if the immediate cause which determined the delirious state also exercised a depressing influence.

Now we must particularly notice that this delirium may pass off, leaving the patient in his normal state, with more or less of exhaustion, just as he would be after a common epileptic fit ; or, if it end fatally, it leaves no lesion of the brain which is at all adequate to cause death, —no softening nor other alteration of texture. In recent cases, indeed, the brain appears quite normal, with the exception of some variation in the quantity of blood in the blood-vessels, dependent on the circumstances which immediately preceded death. As a good example to show that such an apparently normal state of the brain is quite consistent with severe and long-continued epileptic delirium, I shall adduce the sequel of one of the cases to which I have already referred. The patient, Wm. Measures, was admitted in violent delirium. At the end of the second day, as this was subsiding, he had two epileptic fits, one of which lasted half an hour,—the second, five minutes. On the two following days he had a recurrence of the fits, which increased his exhaustion. In the evening of the fifth day he went off into a sleep so tranquil that the nurse did not wake him to give the stimulus ordered for him (℥ij brandy, om. horâ), and he died rather suddenly during the night. The brain was very carefully examined after death, and no morbid appearance whatever was discernible ; the Pacchionian bodies were well developed, and the grey matter of the convolutions and elsewhere was pale ; in all other respects the brain was one which no anatomist could regard otherwise than as healthy.

I shall have again to allude to this pallor of the grey matter as the most remarkable and the most frequent appearance which the brain presents after death from delirium. Sometimes there is with it a large quantity of subarachnoid fluid ; at other times there is a total absence of that fluid : so that the pallor of the grey matter which one might be tempted to attribute to a post mortem infiltration by the subarachnoid fluid, has really no connection with it.

Renal epileptic delirium.—In some of these cases of epileptic delirium we find albuminous urine, either only at the commencement of the attack, and disappearing as it goes off,—which I take to be the least frequent occurrence,—or lasting throughout it and after it, and indicating the probable previous existence of chronic renal disease. These are true epileptic cases ; but the imperfect action of the kidney may be justly regarded as a highly probable exciting cause ; and so frequently do they occur, that in every instance of delirium, especially of the epileptic kind, the practitioner ought to inquire early into the state of the kidneys by careful examination of the urine. Whether a morbid state of the kidneys may properly be looked upon as the determining cause of the epileptic state and of the delirium, is a question which I shall reserve for another part of this inquiry ; suffice it now to say,

that the ascertained co-existence of renal disorder with epileptic delirium is an important feature of such cases, and that clinical research leads us to regard it as an unfavourable omen with reference to the issue of the case. For these reasons I propose to distinguish this affection by the title *renal epileptic delirium.*

George Addis, æt. 43, of intemperate habits, who followed the occupation of a waiter at places of public entertainment, had been in a low gloomy state for some time, in consequence of having been robbed of a sum of money which he had saved. One evening, whilst performing his duties as a waiter, he became incoherent and odd in his manner, and let a tray of glasses fall from his hands. Soon after this he had two or three epileptic fits, and a day or two following he was sent into the hospital. On his admission he was quiet, but not coherent, rather inclined to sleep. On that day, the 1st of December, he had two epileptic fits of short duration. Next day he remained in much the same state, a little more excited, and knocked his head frequently against the wall or bed; fidgetting about in the bed, and staring about him in a vacant manner; at night he became so restless as to require the constant attendance of one person, and he was noisy. Next day he became still more noisy, appearing scarcely sensible; he was evidently unable to continue any train of thought. On addressing him loudly he would begin the answer to a question correctly, but soon pass to some other subject, or become sleepy.

On the fourth day from his admission the epileptic fits recurred, and he became comatose in the intervals, and much prostrated, and died in the coma succeeding the fit.

From the time of his admission the urine was highly albuminous.

The brain, upon careful examination, afforded no mark of disease; the membranes were healthy; the grey matter of the convolutions pale. There was slight hypertrophy of the left ventricle of the heart, and some puckering of one of the aortic valves. The kidneys exhibited an early stage of chronic nephritis.

Delirium in chorea.—Delirium occasionally occurs in the allied malady of chorea. In the cases of general chorea it is developed in the latter stages of those violent shakings which kill the patient by exhaustion.

I have met with one case of severe delirium which was ushered in by symptoms of chorea, and was successfully treated on a plan similar to that which I have adopted with benefit in severe cases of chorea.

The patient, Benjamin Channon, æt. 20, was admitted Jan. 27, 1847; by occupation a saddler; never had epilepsy, but eleven years prior to his admission had chorea, which affected his intellect to such a degree that he became almost idiotic, and was under treatment for three months in the Middlesex Hospital, leaving it perfectly restored. Seven years afterwards he had another slight attack without any impairment of intellect. A month before his admission the choreic symptoms began to reappear: the first indication being fidgetty movements of his fingers, which were soon followed by the characteristic jerking movements of the upper and lower extremities, especially those on the right side, and also of the muscles of the mouth. These symptoms having continued for a month, on the morning of the 26th of January he suddenly took it into

his head that a conspiracy had been formed against him : he jumped out of bed, and rushed down stairs into the street in his night-shirt ; he was with difficulty captured, and brought to the hospital in a state of furious and frantic delirium, talking and shouting out, and sometimes he would quote Shakspeare, in whose writings, it appears, he was learned ; then he would sing and whistle : again he would assume an angry mood, and bite and snarl at all who came near him, and at the bed-clothes, and the strait waistcoat with which he was restrained. The choeric convulsive movements were still present, and he put out his tongue with that peculiar thrust which is characteristic of this disease.

This state of delirium lasted several days, and was accompanied with such great exhaustion that I was compelled to administer food and stimulants very frequently, and in considerable quantity. To a treatment of this kind, to which was added cold affusion twice a-day for three or four days,—a plan which I was led to adopt from the idea of the connection of the delirium with chorea,—the symptoms yielded steadily, so that in a fortnight all signs of delirium had disappeared, and in a month the choreic symptoms had completely vanished.—*Medical Gazette, April* 25, 1850, *p.* 703.

Hysterical delirium.—Not far removed from the epileptic delirium is that which occurs in aggravated states of hysteria, and which is well known to practical men as *hysterical delirium*, and which frequently assumes a chronic form, when it may be properly called *hysterical mania.*

The following sketch will, I think, embrace the leading particulars of the clinical history of this interesting malady :—

A girl of hysterical constitution has been somewhat out of health, without, it may be, any very prominent symptom, excepting, perhaps, headache ; her spirits are more or less depressed, and she shows some tendency to hysterical paroxysms,—she may have one or two ; presently she does not so readily as usual recover from one of these ; she becomes odd in her manner -obstinate -talks at random—refuses food—and she is now evidently delirious, which may be accompanied with more or less of stupor and indifference to all around, or may be violent and furious : she will try to get out of bed—be mischievous—attempt to injure herself or her attendants—wakeful ; and in such cases it is that the patient will act and talk in a manner apparently the most repugnant to the character and reputation she had previously enjoyed, or the real defects in her character : her real inclinations, which principle, or prudence, or cunning, had taught to overcome or conceal, will become developed, and she will be obscene or amorous, or exhibit violent hatred towards others, or other feelings to them : it may be that she will now speak the truth, which before she did not venture to do :—*in delirio veritas*, as *in vino veritas.*

In many instances the paroxysm of hysteria is accompanied by delirium, of greater or less intensity, which comes on and goes off with the paroxysm, or remain for some time after it, or may precede it ; and this form of hysterical delirium obviously resembles the epileptic, in the relation which it bears to the paroxysm, just as the hysterical paroxysm

often resembles the epileptic, so closely that it is impossible to distinguish the one from the other.

This form of delirium is not often fatal. If not treated on a depressing or lowering plan, its tendency is to recover, or to pass into a chronic state, from which the patient may emerge in safety, or may become hopelessly lunatic.

Men are liable to a form of delirium which bears a close analogy with the hysterical delirium of women, and which there can be no doubt is intrinsically of the same nature. I have seen it in over-worked professional men, in students, and in hard-working artizans, even when of temperate habits.

Puerperal delirium.—I shall next notice the delirium which accompanies the puerperal state, which resembles very closely hysterical delirium, and is no doubt essentially of the same nature. It is well known under the name of puerperal mania, or puerperal insanity; but, although this title may justly be given to some of the cases which are very chronic, it seems to me that it is quite as erroneous to say of patients who had suffered from this form of delirium, that they had once been insane, as to class among lunatics patients who had once suffered from the delirium of typhus or of erysipelas.

The clinical history of this form of delirium is told in a few words.

It occurs generally soon after parturition, and during suckling; rarely during the latter months of pregnancy.

It is most frequently brought on by some mental emotion, or by some great exhaustion,—as from a lengthened labour with a dead child, or profuse hemorrhage, or by the debility induced by suckling in a feeble constitution.

It is apt to occur in women of hysterical constitution; but it may be developed in persons with whom the marks of that state of constitution are not prominent.

As in other forms of delirium, the mental disorder appears to be very various, from slight raving to the highest degree of fury, or from slight melancholy to a state of depression and dulness almost amounting to coma.

The greatest number of cases of puerperal delirium recover. Dr. William Hunter pointed out the very important practical fact that it is the amount of fever, or rather perhaps the rate of pulse, which may be taken as the best guide in forming the prognosis. Although I have not seen this form of delirium on an extensive scale, I have seen enough of it to lead me to believe that Dr. Gooch gives a perfectly accurate account of it, when he says that there are two forms, the one attended by fever, or at least by a rapid pulse; the other accompanied by a very moderate disturbance of the circulation; and that the latter cases, which are by far the most numerous, recover; that the former generally die. These are the cases which are in the greatest danger, and which require the most constant vigilance on the part of the medical and other attendants on the patient.

There are, however, as Dr. Gooch remarks, some other circumstances to be taken into the account of the prognosis. Thus the early appearance of the delirium after delivery, especially if it be of the maniacal kind,

is more dangerous to life than its late appearance, and its being of the melancholic kind. "Nights passed in sleep, pulse slower and firmer, even though the mind continues disordered, promise safety to life. On the contrary, incessant sleeplessness, a quick, weak, fluttering pulse, and all the symptoms of increasing exhaustion, portend a fatal termination, even though the condition of mind may be apparently improved." Dr. Gooch adds, that, in the cases which he has seen to terminate fatally, the patient has died with symptoms of exhaustion, not with those of oppressed brain, excepting only one case. One of my own cases died apparently from the exhaustion caused by removing the patient from her bed, which was done with great care, in order to have her cleaned and the bed made.

In examining the heads of patients who die of this disease, we fail to discover any distinct evidence of special lesion, either of the brain or its membranes, excepting in cases where some previous disease of the brain had existed. In those fatal cases recorded by Dr. Gooch, no morbid appearance was found other than that which follows loss of blood. Esquirol makes this statement: The examinations of the bodies of those who have died, whether recently confined or nursing, after having been a longer or shorter time disordered in mind, discovers nothing which throws light upon the material cause, nor upon the seat of this derangement (tom. i. p. 224.

Anæmic delirium.—The next form of delirium which I shall notice is that which arises from deficiency of blood, or what I may call *anæmic delirium.* It may arise where the blood is imperfectly formed, or where the system has been subjected to great losses of blood. Thus in some cases of extreme chlorosis we meet with delirium which is apt to assume the maniacal character; and, on the other hand, it may arise in cases of profuse menstruation or menorrhagia. Some of the cases of hysterical delirium are nearly allied to this; and if the hysterical diathesis exists in a patient subject to excessive losses of blood, it will predispose to this form of delirium.

Again, many of the puerperal cases of delirium are clearly attributable to the excessive losses of blood from hemorrhage, or from unduly active depletion by leeches or by general bleeding. Dr. Marshall Hall lays it down, and, I think, with great justice, that "loss of blood is by far the most frequent and influential source of delirium or mania occurring in the puerperal state."

A good example of this form of delirium is given by Dr. Abercrombie. "Many years ago," he says, "I saw a man who was seized with bleeding from the nose to such an extent that at last it became necessary to arrest by it pieces of sponge carried up from the fauces. Next day he was without complaint, except great weakness; on the third day he became highly maniacal; pulse generally from 90 to 100, and soft."

This form of delirium is not unfrequently preceded or followed by attacks of violent convulsions. I related a remarkable case of this kind in the Lumleian lectures of last year. The patient was a delicate woman, who miscarried, with some hemorrhage; after this she became thin and pale. While in this state she experienced some giddiness of the head, as well as slight delirium, for which she was bled, and had leeches ap-

plied: owing to the giving way of the bandage on her arm, and the application of additional leeches to relieve the supposed congestion of the head, she lost still more blood: her convulsions recurred, and she became delirious and maniacal.

Cases of this kind will be more rare when a more general assent is given by members of the profession to the doctrine that congestion of the brain will not account for giddiness and delirium, and other signs of disturbed cerebral function.

Traumatic delirium.—A remarkable form of delirium has long been known to surgeons as apt to follow severe injuries, whether from accident or from surgical operation. Dupuytren has left a highly graphic description of this form of delirium, and gives it the name of *nervous* or *traumatic delirium.*

A man meets with a severe accident, a compound fracture, or he undergoes a great surgical operation: for a day or two matters seem to go on well, when he suddenly becomes confused in his ideas, incoherent, and at length he becomes wild and talkative, and wakeful: refuses food, tries to get out of bed, perhaps tears off his bandages or splint; and, what is very remarkable, seems perfectly indifferent to pain, and moves the broken limb or injured part as if it were in a natural condition. Sleeplessness is a prominent feature of this delirium; and when that is overcome, as it frequently may be by the careful use of opium, the patient gets well; but sometimes the delirium is so violent as to exhaust the patient in a few days. Nor does the delirium always bear a direct proportion to the severity of the injury. Dupuytren relates the case of a young man in whom it came on in consequence of a slight injury to one of his toes, and killed him in two days.

In these cases, as in the other examples of delirium which I have mentioned, post-mortem inspection discloses no lesion of the brain or its membranes. "Neither in the cerebro-spinal apparatus, nor even in the other organs," says Dupuytren, "can we perceive any material lesion which can explain the disturbance which has taken place during life, which can afford a satisfactory explanation of the cause of death."

Delirium occurs in connection with typhus fever, with erysipelas inflammations of internal organs, as the heart and lungs, and with the exanthemata.

Delirium of typhus.—The delirium of typhus is apt to come on in the second week: it varies in its characters from a low muttering semi-comatose condition to a highly-excited maniacal state. Coming on in the course of a disease, which so terribly prostrates the powers of the patients, it must be regarded as a very formidable symptom, especially when it assumes the maniacal form: for, under the influence of this state of excitement the patient is prompted to get out of bed, or otherwise to make great exertions, and thus exhaustion is produced, and not unfrequently a patient will die from sudden syncope caused by some effort he has made.

I have had many opportunities of examining the bodies of patients after the delirium of typhus; and in no instance have I been able to detect any lesion bearing upon the delirium. The brain in typhus is essentially healthy; but the condition of its blood-vessels corresponds with

that of the blood-vessels everywhere else—namely, a state of laxity of their coats, while they contain, or appear to contain, more than their normal quantity of blood, and that of a dark venous kind ; in some instances there is more or less subarachnoid fluid ; in others the fluid is absent : never is there any sign of an active morbid process, like inflammation, either in the brain or its membranes, tending to generate new matter, as lymph and pus, and to destroy existing tissue.

This form of delirium is of much shorter duration than most of those which I have already described ; nor has it any tendency to degenerate into a chronic state, as is the case with the hysterical and with the puerperal delirium. Like the traumatic delirium, it seldom lasts many days, either killing the patient by exhaustion, with more or less of coma, or ending in recovery.

Erysipelatous delirium.—The delirium of erysipelas resembles very closely that of typhus, excepting in this point, that it is perhaps more frequently of the more active and violent, than of the low and muttering kind. It commonly comes on with more or less of suddenness : you leave your patient going on well ; on your next visit, a few hours afterwards, you find him talkative, rambling, attempting to get out of bed, noisy, and soon he becomes so violent as to require the constant watchfulness of one or two attendants, or the restraint of the strait-waistcoat, to prevent him from injuring himself or others.

In occurs in both idiopathic and traumatic erysipelas ; and is not confined to that of the head or neck, but will take place in cases in which the erysipelas is confined to the trunk, and never reaches the head. It seems more apt to occur in debilitated subjects—in patients after operations which have caused much loss of blood—and in the low and decidedly typhoid forms of erysipelas.

Patients die in it, just as in the delirium of typhus : they die suddenly in an effort, or they become much exhausted, or they fall into deep coma ; but more frequently they recover, especially if care be taken to prevent them from making violent exertions, and to give them a proper amount of support. The duration of this delirium is not in general above a few days, and it very rarely degenerates into a chronic state.

The inspection of the brains in these cases shows no sign of active disease, nor any evidence, as might not unreasonably be supposed, of a state of brain similar to that of the external parts. The erysipelas does not fly from the exterior to the interior : there is no metastatis, although I should not be prepared to say that the brain is not affected by the poison of erysipelas. It is certain, however, from numerous post-mortem examinations, that the brain and its membranes, of patients dying under this form of delirium, exhibit no morbid alteration of any kind sufficient to account for the phenomena. What I have most frequently seen in this, as in other forms of delirium, has been a state of pallor of the grey matter, and an increased number of bloody points in the white matter of the hemispheres.

Rheumatic delirium.—The form of delirium which accompanies inflammation of the lung, or of the heart, occurs so commonly, if not uniformly, in the rheumatic state, that I shall describe it in connection with that delirium which arises in the course of rheumatic fever, under the name of *rheumatic delirium.*

The following description of this form of delirium accords with what I have myself seen, and what I find recorded by others :—

A patient is seized with all the ordinary symptoms of rheumatic fever, and he goes on without any untoward symptoms,—it may be only for three or four days, it may be for a week, or even later,—when the nurse having perhaps reported that he passed a restless night or two, and wandered more or less, we find him delirious, raving, talking wildly, and, as in the traumatic delirium, entirely disregarding his hitherto exquisitely painful, and still swollen joints. The tendency in these cases is to the acute maniacal state, and to wakefulness ; so that frequently the patient requires restraint, and always the closest watchfulness.

As in the other acute forms of delirium, patients often die suddenly in this, evidently from exhaustion. Sometimes they quickly fall into a state of profound coma, which lasts from one to twenty-four hours, and terminates in the death of the patient. I suspect that moving patients from one place to another in rheumatic fever is apt to bring on this mode of termination ; for I have had several cases in which a patient was brought into the hospital late in the afternoon having been three or four days ill of rheumatic fever, and in the course of the night he became delirious, and then comatose, and died.

This delirium is sometimes ushered in by other symptoms, which denote a more extensive disturbance of the nervous system than delirium would do. Thus, a patient will be seized with chorea-like jactitations affecting the upper extremities, and the muscles of the face ; and sometimes a condition almost tetanic is present, and more or less of rigidity and opisthotonos are produced.

Coincident with the first appearance of these symptoms, that is, either of the delirium or the jactitations, we frequently find, but by no means always, the first signs of inflammation of the pericardium, or of the endocardium, or of one or both lungs, or of the pleura ; and as the delirious state diverts the mind of the patient from the perception of all pain, it often happens that no other indications of the internal inflammation can be obtained than those of the physical signs, the rubbing sound, or the bellows-murmur, or the altered breathing sounds ; and hence it has not unfrequently happened that in the midst of the great disturbance of the intellect, the inflammation within the thorax has been unsuspected, and undetected.

Judging from my own observation of this delirium, I would lay it down that it occurs chiefly in those patients who exhibit considerable pallor, whether that pallor be simply the result of the rheumatic state, or of that combined with the effects of a greater or less loss of blood. I have seen it brought on in a patient, who had previously exhibited no untoward symptom, by the application of some leeches to a rheumatic joint, without any cardiac inflammation : and I have also seen it come on after very large bleedings, both general and topical, where there was no very extensive development of the rheumatic state, and where, also, the signs of cardiac inflammation were at most indicative of but a slight endocardial inflammation. But, on the other hand, nothing is more certain than that it has come on where there has been no bleeding practised at all : and that it has got well when bleeding, topical or general, has been practised *after* the appearance of the delirium.

The inexperienced practitioner is apt to mistake these cases for inflammation of the brain and its membranes, and to treat them accordingly.* —*Med. Gazette, May* 3, 1850, *p.* 745.

18.—*On the Treatment of Tubercular Meningitis.* By Dr. Hahn.—The author first speaks of meningitis occurring suddenly, without being preceded by symptoms indicative of previous tuberculous diathesis. In these cases he advises bleeding and calomel, but relies chiefly on the latter, guarding at the same time against unnecessary salivation, the severity of which may destroy life after the disease for which the mercury was given has subsided. He speaks also in strong terms of the cold affusion, by which he states that he has several times succeeded in rousing the child after the supervention of complete coma. Another measure of great value in the same emergency, is friction of the scalp with tartar emetic ointment, repeated every two hours, until pustulation is established. This is a severe measure, and occasionally induces gangrene, but there are few parents who would not readily see their infant snatched from impending death, though at the risk of subsequent intense suffering. It is, however, possible by management, to avoid such excessive inflammation. Of the success of this method the author speaks in high terms, having by it saved fourteen cases in apparently a hopeless state of coma.

In the second class of cases noticed in this memoir, viz., those in which the cerebral symptoms are preceded by others, denoting a general tubercular cachexia, a modified plan of treatment is advised, bloodletting, except locally and sparingly, is contraindicated; neither is it safe to push calomel to the same extent. The author in this, as in the preceding case, relies much on counter-irritation of the scalp, and advises the same means of fulfilling this indication.

The memoir terminates by the recital of several cases in which a cure was obtained by the tartar emetic friction of the scalp, under the most unpromising circumstances. Of these cases it will suffice to cite one.

A fine boy of nine months old, was suddenly attacked with convulsions. He recovered from these, and cut his first teeth shortly afterwards; he was soon observed to fall away, to become listless, and to lose his appetite, without any condition of tongue which could indicate intestinal derangement. His bowels became constipated, his pulse irregular, and he began to vomit and to become torpid. Fever was soon added to his symptoms, and it was evident that he was the subject of meningitis. Leeches were applied, and calomel given, but in spite of treatment he lapsed into complete coma. As soon as the latter symptom become distinct, tartar emetic ointment was rubbed into the scalp every four hours over a space the size of a crown piece. Free suppuration ensued, and signs of amelioration were speedily witnessed. The child became gradually more sensible, his appetite returned, and in a fortnight all traces of his malady had vanished.—*Prov. Med. and Surg. Journal, Nov.* 28, 1849, *p.* 664.

[* Dr. Todd's further observations on this subject will be found among the "*Addenda*" at the end of this volume; the lectures containing them not being published in time to be printed in this place.]

19.—ON THE CEREBRAL DISEASES OF INFANCY.

By Dr. E. Copeman, Consulting Accoucheur to the Norwich Lying-in-Charity.

In taking a general view of what has been written on cerebral diseases, we shall be struck, not so much with a deficiency of knowledge as to their character, pathology, or symptoms, as with the indefinite and unsatisfactory methods of treating them. This defect is probably due to the excessive desire manifested to base principles of treatment upon *post mortem* appearances; but, whilst the latter, although fully known and accurately described, vary so much in relation to the symptoms they are supposed to occasion, how can the former be depended upon for safely averting the great dangers we have to encounter? There is yet much —very much, to be learned in the treatment of these diseases. In what manner can such knowledge be most readily and perfectly obtained? The investigations hitherto made upon this subject, enable us to determine certain generalizations, and to state a few established facts, which afford useful hints for practical application.

1. Cerebral diseases occur most frequently in children of a scrofulous habit, or born of scrofulous parents.

2. Scrofula greatly modifies the character of cerebral as well as other diseases.

3. Cerebral diseases may exist independently of scrofula.

4. Headache, vomiting, constipation, and more or less pyrexia, are a combination of symptoms denoting, in children, serious, and often unmanageable cerebral disease.

5. A species of hydrocephalus, chiefly indicated by the preceding symptoms, is generally accompanied with, or depends upon, tubercular disease of the brain or its membranes.

6. There exists another species of hydrocephalus, attended with the usual symptoms of phrenitis, of a strictly inflammatory nature, and curable by strictly antiphlogistic remedies.

7. Hydrocephalus resulting from tubercular disease may assume an active inflammatory type, and be scarcely distinguishable from the last variety, except from its not being so amenable to antiphlogistic treatment.

8. Symptoms similar in many respects to those of acute hydrocephalus in one or other of the above forms, may arise from a state of system diametrically opposed to inflammation; these are curable only by a nourishing and mildly-stimulating plan of treatment.

9. Hydrocephalus, generally speaking, does not occur before the age of two years; and boys are more liable to it than girls.

10. Treatment, to be effectual, must be commenced at an early period of the disease.

11. The symptoms of cerebral diseases in children, and the *post-mortem* appearances, have not a definite or constant relation to each other; and the former are more to be depended upon than the latter for indications of treatment.

12. Constipation is not essential to the phrenitic variety of hydrocephalus.

13. Certain cases, accompanied with symptoms so constantly in connection with tubercular encephalitis as not to be distinguishable from the latter form of disease, admit of being cured; and may therefore be fairly considered as instances of the *curability* of a disease which is generally supposed to be incurable.

The treatment of diseases of children requires considerable tact and discrimination, both as to the nature of the remedies to be used, and the mode of employing them. We have tender bodies to deal with; their period of life greatly modifies the action of medicines; errors of judgment in prescribing are of more serious consequence, and life is altogether in greater jeopardy. It is often necessary to reduce arterial action, and *blood-letting* is sometimes attended with success, but in very young children this is a dangerous remedy, and probably not a few have fallen a sacrifice to its depressing influence. The usual method of drawing blood in children is to apply leeches, and children have bled to death from leech-bites. Cupping is an operation not easy to perform in children, but it is preferable to leeching, because by it the quantity of blood to be abstracted can be regulated, and the bleeding can be stopped as soon as enough blood has been removed. Blood-letting, as a remedy, is fortunately seldom indispensable at the period of life in which children are most frequently affected by cerebral diseases; my own experience would almost say *never;* for in a period of more than fifteen years I have never myself drawn blood, either locally or generally (save by scarification of the gums or eyelids,) from a child under six years of age, for any complaint whatever. How then are inflammatory complaints to be treated? What are we to do in a case of phrenitic hydrocephalus, if we are not to bleed? Are we possessed of any other effectual means of combating inflammation? Yes: we have many other resources for lessening vascular action in children, which will oftentimes enable us to spare a fluid so necessary to existence, and so often wanted in later periods of diseases, when it is difficult, if not impossible, to supply it. The *warm bath* is a powerful agent for relieving the circulation in infancy; *antimonial medicines* will reduce power to almost any necessary amount in children; *purgatives* also; but owing to the extreme susceptibility of the intestines of children to take on irritation with which the brain very quickly sympathises, it is not often advisable to use them freely; we may, however, safely employ enemata, which have the effect of reducing the pulse and lessening heat of skin in a very satisfactory manner, as well as of removing offending matter, and encouraging a flow of bile. But there is another class of medicines both safe and effectual for abating inflammatory affections in children, provided the stomach be not too irritable to retain them. I mean *diuretics;* and I have repeatedly observed, whether in fevers or inflammations, that promoting a copious flow of urine has, in a striking manner, produced an antiphlogistic effect. These measures may be employed also in combination, and when they are thus combined and judiciously applied, I have yet to learn that they are not capable of effecting as much for the removal of febrile action, with scarcely the possibility of doing harm, as is usually effected by blood-letting. In the more advanced stages of inflammation, *calomel* for the removal of

lymph, and *iodine* (liq. potassii iodidi comp.) for the absorption of effused fluid, are well known and trustworthy remedies.

[Dr. Copeman remarks upon the difficulty there often is in distinguishing those cases which require stimulants from those which require an antiphlogistic plan of treatment, and recommends a minute attention to symptoms, as the only means by which this difficulty is to be overcome. He considers that the occurrence of febrile disturbance is generally a very good indication that simple remedies will not be sufficient, and that active treatment is required. After referring to this symptom in thoracic and abdominal affections, he says :—]

In head affections, unattended with fever, we ought not to resort hastily and actively to depletory measures, however much we may be inclined to suspect the existence of certain pathological conditions supposed to require antiphlogistic treatment. But there may be febrile excitement in a case where antiphlogistic treatment would be fatal. How are we then to judge? If the fever be of an intermitting character, leaving the patient feeble and depressed in the intervals, the pulse being unsteady and variable, it behoves us to be guarded in our employment of lowering remedial measures.

The following circumstances seem especially deserving of attentive consideration in the treatment of the diseases of infancy and childhood :

1. The delicate, perhaps only partially-developed, structure of the vital organs, the intolerance for the most part, of powerful medicines or doses, and the great restorative powers of nature at an early period of existence.

2. The necessity for adapting our remedial agents to the delicacy and susceptibility of the structures they are intended to influence, and fulfilling any given indication of treatment by the least possible violence or precipitancy, by the gentlest means.

3. Whilst entertaining a just idea of the nature and history of the disease we have to treat, we must at the same time observe particular symptoms minutely, and vary our plan of treatment according to the information which those symptoms are capable of affording.

4. The importance of endeavouring *to the very last* to preserve life, however desperate the circumstances may appear, keeping always in remembrance, that "whilst there is life, there is hope."—*Prov. Med. and Surg. Journal, Nov.* 28, 1849, *p.* 650.

20.—*On the Relation between Epilepsy and Puerperal Convulsions.* By Dr. W. Tyler Smith.—[At a late meeting of the Westminster Medical Society, Dr. Smith referred to the common opinion of the increased liability of epileptic persons to puerperal convulsions, founded, as he presumed, upon the resemblance between the two affections. Dr. S. remarked that there were considerable differences between the two, which he thus pointed out :]

Epilepsy is generally a chronic—puerperal convulsion, an acute disease. Epilepsy commonly leads to idiocy ; puerperal convulsions to mania. Asphyxia is more nearly reached in puerperal convulsions than in epi-

lepsy. Epilepsy is a disease of years; puerperal convulsion, a disease of hours or days. Epilepsy is connected with the ordinary functions of the body; puerperal attacks belong to an extraordinary function, of limited duration. In the one, consciousness is generally recovered between the fits; in the other, the continuance of coma from fit to fit is very common. The treatment required in the two diseases is very dissimilar. In epilepsy, there is generally the characteristic aura; in puerperal convulsions this is wanting. In puerperal convulsions, œdema of the extremities is as common, as it is rare in epilepsy. These circumstances must induce us to enquire whether puerperal convulsions ought not to be studied as a distinct and independent disease, as a variety of convulsion as far removed from epilepsy, as epilepsy was removed from the convulsions of infancy. But the important question, which could only be decided by experience, was—Were epileptics predisposed to puerperal convulsions? The author related four cases of epileptics becoming mothers, which had fallen under his own observation; in one, the first pregnancy and labour had been completed without any convulsion: in the second, two labours had been completed without puerperal convulsions, and the fits were rare during pregnancy; in the two remaining cases, the epilepsy had been very much relieved during the whole of the child-bearing epoch; and in one, ten pregnancies and labours had passed, without any convulsive seizure. These latter cases were now near the catamenial decline, and were affected with paroxysmal seizures of an epileptic character. Dr. Smith related the particulars of eleven other cases, which had been supplied to him by Dr. F. Churchill; Drs. Swayne and Herapath, of Bristol; Dr. R Barnes; Mr. W. F. Barlow; Mr. Higginbottom; and Mr. R. U. West. The number of pregnancies in the fifteen cases amounted to about fifty-one. Puerperal convulsions of a decided character only occurred in two labours. In one case, there were three attacks of convulsion after the eleventh labour of an epileptic patient; and in another case, there was a single seizure the day after one of five labours. Generally the epileptic attacks were fewer, and, in several cases, disappeared altogether during gestation. Thus, the presence of epilepsy by no means appeared to be an active predisposing cause of puerperal convulsions; and, so far as the author's enquiries had extended, there was no tendency in puerperal convulsions to be followed by epilepsy, though it might be the case, when organic disease of the nervous centres was induced by the puerperal attacks. Dr. Smith entered upon a consideration of the causes which lead to the amelioration of epilepsy during gestation, referring it principally to the rest from the ovario-uterine excitement of menstruation, in pregnancy. He dwelt on the frequency with which epilepsy was connected with the catamenial excitement, many cases occurring only at these periods, and others being aggravated at the monthly date. He also pointed out the infrequency of epilepsy, in purely amenorrhœal or chlorotic subjects, and referred to the fact that other disorders dependent upon ovario-uterine excitement, as hysteria, and dysmenorrhœa, were relieved by pregnancy. As far as the cases now detailed went, it appeared that marriage was not so much to be dreaded in epileptic females as had been supposed, particularly where the fits were connected with

catamenial excitement. It was clearly indicated that in epilepsy great attention should be given to soothe menstrual irritation, and that puerperal convulsions should be studied and treated without any special reference to epilepsy.

Dr. Robert Lee said that he had recently had under his care a lady who had been suffering from attacks of epilepsy every fortnight during the last eight or ten months, subsequent to the birth of her second child, when she had puerperal convulsions, and he was called to see her. This lady had never before been subject to epilepsy. Not having succeeded in stopping the fits, which at first occurred during the day, and latterly during the night, he had requested her husband to consult Dr. Marshall Hall, and to place her under his care. The fits still continued every fortnight. This case Dr. Lee said was the only one in which puerperal convulsions terminated in epilepsy, which had come under his observation during twenty-two years. Of the fifty-nine or sixty cases of puerperal convulsion which he had seen during that period, there were three in which epilepsy had previously existed in early life, and a considerably greater number where there had been hysteria. Dr. Lee was of opinion that chorea, hysteria, epilepsy, puerperal convulsions, and puerperal mania, were all different diseases, though closely allied to each other. He related a case of chorea in the sixth month of pregnancy, which occurred in St. George's Hospital in 1842, in which, after the expulsion of the contents of the uterus, the symptoms of chorea passed into fatal puerperal convulsions. The brain and spinal cord were both carefully examined, but no morbid appearance was discovered to account for the phenomena. On what condition of the brain and nervous system these diseases depended, he believed to be wholly unknown; and he considered it certain that they might all occur without any organic disease whatever. He had never supposed that epilepsy and puerperal convulsions were the same disease. On the contrary, he had always maintained, that though the symptoms observed during the fits were similar, they were different diseases. This was also the opinion of Dr. Burns, who states, in page 483 of his 'Principles of Midwifery,' that "puerperal convulsions are quite different from epilepsy." Some of the circumstances in which they differ have been pointed out by Dr. Burns, but in a less distinct manner than had been done by the author of the paper now read.—*Lancet, Dec.* 15, 1849, *p.* 644.

21.—*On the Use of Belladonna in Epilepsy, Hysteria, and Neuralgia.* By M. Debreyne.—*Epilepsy.* M. Debreyne has found belladonna most useful in those cases of epilepsy, in which the attacks occur frequently, and even daily. In young subjects, it is not rare to find them affected with worms at the same time; and M. Debreyne even supposes that this coincidence is constant, the worms being either a cause or a complication of the epileptic convulsions. Hence, he combines vermifuge medicines with belladonna, with the effect of generally producing a rapid alleviation of the symptoms. In epilepsy, the dose for the first day should be ten centigrammes (1½ grains) of aqueous extract of belladonna; five centigrammes morning and evening: on the second and third days, five centi-

grammes, morning, noon, and evening; and on the remaining days, ten centigrammes are to be taken morning and evening. M. Debreyne refers to patients who have thus taken sixty-five centigrammes (10 grains) of the extract, in twenty-four hours, without experiencing the least inconvenience. In all cases, the use of the remedy must be continued for some time. An epileptic patient, aged 48 years, took twenty centigrammes of extract of belladonna daily, during *twenty months*, with the effect only of diminishing the duration of the attacks: the treatment was persisted in, and they gradually became less frequent, and at last completely ceased. In a little girl, aged eight years, the attacks began to become less frequent on the fourth day of the treatment; and at the end of a month, the patient was cured. As a precautionary measure, however, she continued to take five centigrammes of extract of belladonna daily, during two months.

Hysteria. This affection receives marked benefit from belladonna. The following is M. Debreyne's formula: camphor, twelve grammes: assafœtida, twelve grammes; extract of belladonna, four grammes; aqueous extract of opium, one gramme; syrup of gum, a sufficient quantity to make 120 pills. One pill to be given the first day, two on the second, and the dose is to be gradually increased to six pills in twenty-four hours.

Neuralgia. M. Debreyne relates several cases of the successful employment of belladonna in this affection. One patient had suffered during seven or eight years from very severe neuralgic pains in all parts of the head. All the usual remedies had been tried without effect; a pommade of belladonna was applied, which produced marked relief on the first day, and cured the patient in a month. Another case was one in which daily paroxysms of frontal neuralgia had obstinately continued for eleven years. The belladonna pommade was applied: the pain suddenly ceased, and had not re-appeared two months after the employment of the remedy. The pommade which M. Debreyne uses is highly charged with the active principle. It consists of extract of belladonna, lard, of each twelve grammes; opium, two grammes; to be mixed accurately. It is rubbed over the seat of pain, especially during the exacerbations, or three times a day. On each occasion, a piece of the size of a hazel-nut is to be rubbed in for five or six minutes, until it is perfectly absorbed: this may be furthered by adding a little saliva from time to time.—*London Journal, April*, 1850, *p.* 386.

22.—*Treatment of Neuralgia and Rheumatism by Cold Douches and Sweating.*—At Bellevue, near Paris, there is a fine establishment, in which everything of practical value connected with "the water-cure"—be it hot or cold—is applied to the treatment of various obstinate affections. The advantages obtained from a rational employment of several powerful agents, as distinguished from the empirical use of one alone, are very great. They were pointed out in an excellent Memoir which M. Fleury presented at the last meeting of the Academy of Sciences. The author selected forty-six cases, observed at the establishment during the last four years, and from their results deduced the following conclusions:—

Five patients, labouring under attacks of acute neuralgia from four to fifteen days, (facial, intercostal, sciatic), were cured by one to three applications of the cold douche, both general and local, employed after the use of the dry stove, which had produced copious transpiration. Here the revulsive action of heat followed by cold was much more energetic than that of flying blisters or the cautery.

Eleven patients, attacked by acute muscular rheumatism, fixed in its seat and very severe, were rapidly cured in the same manner.

In *four* cases of obstinate neuralgia, which had resisted every known method of treatment from four to ten years, a cure was obtained by cold douches (general and local), sometimes preceded by the use of the hot-air bath. The duration of the treatment varied from one to six months, and its average was three months. *Three* patients, who for five to fifteen years had presented, in the most marked degree, that *ensemble* of symptoms known under the title of "nervous accidents," and who had been reduced by them to the lowest state, in spite of medical art, were cured in the same manner. Here, however, the treatment was continued from seven to eighteen months, and the average duration was more than a year.

Finally, in twenty-three cases of chronic muscular rheumatism, which had resisted every species of treatment, and the most celebrated mineral waters of Europe, the cold douches after sweating effected complete cures. The average time of treatment was four months ; the minimum one month ; the maximum seven.

Here, it must be confessed, we have a rational method of treatment, applied according to the rules of art, and as successful as the miracles of hydropathy.—*Med. Times, Feb.* 2, 1850, *p.* 77.

23.—*On the Treatment of Neuralgia accompanying Herpes Zoster.* By E. Humpage, Esq., Bristol, Dr. S. Palmer, Newbury, and P. Marriott, Esq., Aberystwith.—[For the distressing and intractable neuralgic pain which often (or, as some say, *always*), accompanies herpes zoster, Mr. Humpage gives the following advice :]

One of the best remedies in this very troublesome disorder, is, the application of a blister, *near*, or *over* the painful part : immediately it is healed, let there be applied a piece of belladonna plaster on leather.

The neuralgia is always relieved, and generally removed : the stimulus of the vesication, followed by the sedative influence of the belladonna, appearing to exhaust the morbid influence, (or whatever else we like to call it), on which the pain depends, and healthy function following, the patient is cured.

Of course in all such cases we must attend to the general health : but I do not believe that all the tonics of the Pharmacopœia would ever cure a local neuralgia, *excited apparently* by the morbid secretion of a previous disease.

[Dr. Palmer says that his cases]

Principally occurred in elderly persons ; and after using a variety of medicines, I found that this distressing *sequela* yielded most readily to

grain doses of the oxide of silver, combined with the compound galbanum pill and extract of hyoscyamus, I likewise employed, as an external application, the tincture of arnica montana, with the tincture of soap and opium, and as the results in all were most satisfactory, I feel justified in recommending this mode of treatment.

[Mr. Marriott, who states that he has seen a large number of cases of this affection, believes that there are no means of curing it. He says that the pains subside spontaneously, and that the period of their duration is in proportion to the age of the patient; varying from six or eight weeks, at the age of fourteen or sixteen, to two years or more at the age of seventy and upwards.]—*Prov. Med. and Surg. Journal, Dec.* 26, 1849, *p.* 718.

24.—*Cases of Neuralgia depending on Disorder of the Digestive Organs.* By Dr. JAMES STARK.—[The first case occurred in a lady of forty years old, to whom Dr. Stark was called on the 7th May, 1849. This lady had had the disease for fifteen years, during which she had been subjected to various kinds of treatment, but without any decided relief. The original cause of the attack was supposed to be exposure to cold when the body was overheated in dancing. Dr. Stark says:—]

I learned that the fits of neuralgia were always most severe in spring, and that for several years past they became at that time so agonizing and so protracted as quite to unfit her for the duties of life. That day, and for some months previous to my seeing her, the paroxysms of neuralgia had commenced about eight in the morning, by a creeping and thrilling sensation over the left side of the head, concentrating about the *supra-orbitar foramen*, and extending inwards and backwards towards the base of the eye and brain. The pain rapidly increased in intensity, till it became insufferable, as if the head were squeezed in a vice of burning iron, and she got quite deranged. In this state she lay, tossing in restless extasy, till about two o'clock in the afternoon, when the pain began to abate, and by three o'clock had in general left her, weakened, prostrated in mind and body, and unfit for anything. During the summer and autumnal months, the neuralgic fits were in general of shorter duration, rarely exceeding half an hour in continuance, and not so severe, but were more liable to return on excitement, or after meals.

The tongue had a smooth, swollen or œdematous, glassy aspect, with a thin viscid white coating, through which the papillæ projected with a flattened button-like appearance. The breath had a peculiar heavy odour. The skin was soft, clammy, very loose, as if wanting both in elasticity and in tonicity. The complexion was pasty. The bowels reported irregular, but generally costive, often five days passing without a motion, at other times slight diarrhœa for a-day or two. The catamenia were stated to be regular, but watery and rather profuse. The pulse was 60, languid, and very compressible. There was no appetite. She suffered from flatulence after meals, and had faulty digestion.

As the *primæ viæ* appeared in this case to be chiefly at fault, and the disease presented a decided periodic tendency, there seemed reasonable grounds for holding out prospects of relief, to a certain extent at least. She was, therefore, ordered to take two grains of bebeerine at six o'clock evening, a laxative of a particular kind at bed-time, and other two grains of bebeerine at seven o'clock morning daily till relief was experienced. The laxative consisted of jalap fifteen grains, magnesia and carbonate of soda, of each twelve grains, and calomel half a grain.

After two days, viz. on the 9th of May, I repeated my visit at eleven o'clock morning, and found her so much relieved, that, instead of lying in bed insensible, or deranged with the pain, she was dressed, and was sitting up. The pain, though severe, and confined to the branches of the *supra-orbitar nerve*, was bearable, and she thought from the sensation that it was beginning to abate for the day. The laxative had operated powerfully, bringing away a large quantity of hardened scybalæ of a disgusting odour. She and her attendants mentioned that, since the first laxative operated, the pain had not been so severe as to deprive her of her senses, and even the first day was diminished in duration about three hours. She was directed to continue the medicines for at least a-week regularly, then only take the laxative every other night, and the pills of bebeerine in the morning only.

By the 20th May, the neuralgic pains had entirely left her, and for several mornings previous had been so trifling as to give no great annoyance. The tongue was now clean, and more healthy looking. The complexion was clear, and had lost almost entirely its pasty look. The appetite was good, the digestive powers had improved, and she suffered little from flatulence. The laxative was therefore diminished by one-half, and directed to be taken every third night, one grain of bebeerine being continued every morning for a week longer. After this the bebeerine was stopped, and a laxative of magnesia taken occasionally so as to regulate the bowels. By following these directions, and having recourse to her old laxative whenever the pain threatened to return in consequence of exposure to cold, she has escaped all protracted suffering up to this date, 22nd February, 1850, and finds the disease quite manageable.

[The other patient was an elderly unmarried lady, without teeth, who was seized with the pain whilst eating oysters. It was supposed that the gum had been wounded by a fragment of oyster-shell, but no such wound could be detected. After three years, during which the patient suffered severely without applying for any medical aid, Dr. Stark was sent for. He tells us:]

When called to see her on the 3rd of February, 1849, I found her suffering acute agony from a pain which seized her suddenly and without warning, in the gum of the left lower jaw, at a point corresponding to the position of the last molar tooth. The pain was compared to a red-hot knife piercing the jaw; it continued with great intensity for about three minutes, then wore off, striking forwards to the chin, and backwards to the ear. The paroxysms were always excited by eating,

and were most severe and frequent for about two hours after taking food. Taking wine or brandy greatly aggravated the severity and increased the frequency of the paroxysms. After a meal, pressure on the gum, or speaking, were almost sure to induce the neuralgia; but after this the gum could in general be freely handled without inducing the pain. The gum was quite healthy in appearance, smooth, neither injected nor swollen more than the healthy side, and firm over the jaw-bone; without the slightest appearance of cicatrix or any prominence to indicate the lodgment of a foreign body within it. The tongue was coated with a thin whitish viscid-looking fur; the breath had a heavy acid odour; and the bowels were habitually very costive, sometimes not moving for five and even eight days. The appetite was bad, the pulse languid and slow, as might be expected in an old person; the sleep troubled, and disturbed with dreams.

This case also appeared to be one where the disease originated in, and was dependent on, disordered function of the digestive organs. It had suddenly attacked her when eating an acid meal of raw oysters; it was aggravated by the articles of diet received into the stomach, and notably so both in severity and frequency by those drinks (wine and brandy) which, in an unhealthy stomach, more speedily run to acidity. She was therefore directed to take daily, at bedtime, a gentle laxative of magnesia, carbonate of soda, and chalk with mercury powder, and morning and afternoon two grains of sulphate of quinine. Within a week, the neuralgic pain had almost completely left her, not seizing her oftener than twice or thrice daily, and then only lasting for a moment. The quinine was therefore stopped, and Henry's calcined magnesia substituted for the laxative; the neuralgic affection from day to day wore away, and for the last nine months she has had no recurrence of it.

These two cases were selected from several others, as clear instances of the close connexion between *tic douloureux* and disordered state of the functions of the alimentary canal. I am quite aware that some late writers on this subject have positively asserted that they have never seen one case of neuralgia referrible to such an origin; but, in cases of this kind, facts are of much greater importance than opinions; and the above cases appear to demonstrate so clearly that such a connexion does exist, that I feel inclined on the other hand to assert, that, in the great majority of cases which occur, the *fons et origo mali*, lies with the digestive organs. If a severe and undoubted case of neuralgia, of fifteen years' standing,—one, too, deemed incurable by several practitioners,—be absolutely cured by restoring the functions of the digestive organs,—again attacks, or threatens to attack, whenever the bowels are neglected, and is again and instantly removed by the use of laxatives of a particular kind, independent altogether of antiperiodics,—I leave the profession to draw the conclusion as to the cause and origin of the disease. I have never yet seen a case of *tic douloureux* (not depending on organic disease) in which the digestive organs were not more or less disordered; and since I adopted this view of the disease, and treated it accordingly, I have not yet met with one case which proved rebellious to treatment. Indeed I am not quite sure that the antiperiodics (quinine, bebeerine, and iron) in common use in this disease, when they do

aid in removing it, do so more by virtue of their action in improving the tone of the stomach and bowels, than through their antiperiodic property.

Only three days ago (20th February), when looking over my notes of these cases, I was suddenly called to see the most striking instance I have yet witnessed of the close connection between neuralgia and disorder of the digestive organs. A young boy, of about five and a-half years of age, had just finished his dinner, when he suddenly screamed out and threw himself on the ground in the greatest agony. His screams were frightful to hear, and he appeared quite distracted, and on the point of going into convulsions, from pain referred to the back molar tooth of the lower jaw, which tooth appeared perfectly sound. I learned that for some time past, he had been much troubled with indigestion, acidity of the stomach, and irregularity of the bowels, and that many articles of food, such as beef, potatoes, vegetables, or wine, beer, and tea, caused great uneasiness, feverishness, with restlessness, and starting during sleep. He had that day, however, seemed better than usual, and at his urgent request had barley vegetable broth, boiled beef, and a suet dumpling.

Coming fresh from the perusal of the above cases, it appeared to me quite clear, that I had to deal with a case of neuralgia (call it acute toothache if you will), dependent on a disordered state of the digestive organs, more immediately excited by an overloaded stomach, probably accompanied by acidity. A sulphate of zinc emetic was therefore immediately administered, which cleared the stomach of a large quantity of soup of a strong acid odour, and all he had eaten for dinner. As soon as the vomiting was over, he was caused to swallow a dose consisting of chalk, magnesia, carbonate of soda, and cinnamon powder. He had not swallowed it two minutes when the neuralgic pain ceased, and has not since returned.

These cases, then, should have the effect of inducing the profession to direct their attention more to the connection between functional disorder of the digestive organs and neuralgic affections, as I feel persuaded from my own experience that the more the subject is attended to the closer will the connection be found to be. Rheumatic must not, however, be confounded with neuralgic affections, or very false conclusions may be arrived at, as the pathology and treatment of these so far kindred affections are entirely different.—*Edin. Med. and Surg. Journal, April,* 1850, *p.* 390.

25.—*Observations on the Effect of Electrical Currents on the Nerves, and their Therapeutical Application.* By M. Matteucci, Professor in the University of Pisa.—[The following remarks are taken from Matteucci's lectures 'On the Physical Phenomena of Living Beings,' translated by Dr. Pereira. The conclusions aimed at by M. Matteucci respecting the force of the contraction excited by the electric current in different cases, are these :]

1. The contraction excited by the electric current, transmitted along a

nerve in the direction of its ramification, and which we call *direct*, is always more energetic than that which this same current produces when passing along the nerve in the opposite direction.

2. The direct current weakens and rapidly destroys the excitability of a nerve ; whilst the passage of the inverse current augments it within certain limits.

3. To produce these effects, the action on the nerve, of the direct as well as of the inverse current, ought to be continued for a certain time, which will be longer in proportion as the excitability of the nerve is weaker.

It is very easy to prove, by experiment, the most important of these conclusions ; that is to say, that when the direct current traverses the lumbar nerve of a frog for twenty or thirty minutes, there are no further contractions, either when interrupting or closing the circuit: on the contrary, the contraction obtained by opening the circuit of the inverse current, after many hours' passage, scarcely differs from that which occurred at first, when the nerve was endowed with great excitability. This difference in the excitability of a nerve, according as it has been submitted to the passage of a direct or inverse current, can be observed whatever may have been the manner in which the nerve is stimulated. When we operate with the inverse current on a very excitable nerve, and one which has never before been submitted to the passage of the current, it is impossible to discover any difference between the contraction excited by the opening of the circuit of this current after the passage has continued for one second, and that which occurs after the passage has been continued for ten or twenty seconds. It does, however, exist: but to appreciate it, it is necessary to proceed more rapidly. If the passage of the inverse current be limited to a small fraction of a second, we find, on opening the circuit, a weaker contraction than that which is obtained after the current has circulated for one or more seconds. It is very easy to prove this, by closing the circuit by the aid of a wheel furnished with a metallic tooth, and to which we attach one of the wires of the pile during its rotation. When the nerve has lost a part of its excitability, we then readily perceive that the contraction manifested on opening the circuit increases proportionally to the time that the circuit has been closed. The greatest effect of the passage is obtained at the end of fifteen or twenty seconds. It is needless to say, that these effects do not continue to increase on a dead animal.

Peculiarities of Electric Irritation of the Nerves.—I consider it necessary to give here a summary of the principal differences which have been ascertained experimentally, between the effects produced by electric irritation of the nerves, and those determined by other stimulating agents, such as heat, chemical and mechanical actions, &c. The following are these different distinctions :—

1. Electricity is the only irritant which can excite, at one time sensation, and at another contraction, according to the direction in which it traverses a nerve.

2. The electric current alone, in passing transversely across a nerve, produces no phenomena due to the excitability of a nerve.

3. The electric current has no effect on the nerves, that is, it neither causes contraction nor sensation, when its action on the nerve is prolonged.

4. The electric current alone can modify the excitability of a nerve, and even rapidly destroy it, when the current circulates in a certain direction, and can preserve or augment the excitability, when passing in the opposite direction.

5. Lastly, of all irritating agents, the electric current is the only one which possesses, for a long space of time, the power of reviving the excitability of the nerve, when it has become very much enfeebled in respect to other stimulants.

[The following remarks are made on the]

Therapeutical Use of the Current.—I cannot conclude this lecture without stating some of the therapeutical applications made of the elec tric current, and founded upon the scientific principles, which I have made known to you.

In Paralysis.—Abstraction being made of all purely theoretical ideas, and independently of all hypothesis of the nervous force, we may admit that, in certain cases of paralysis, the nerves undergo an alteration analogous to that which they would suffer if they had been subjected to a continued passage of the electric current. We have seen that, in order to restore to a nerve the excitability lost by the passage of this current, it is necessary to subject it to the action of the inverse current.

I must add, in favour of the efficacy of the therapeutic use of this current, that a limb, although paralysed, constantly suffers some contractions when it is submitted, either to the passage of a current or to the action of the electric discharges; and these contractions favour the restoration of the functions of the muscles. Experiment confirms these ideas: divide the two sciatic nerves of a living frog, allow one of the two limbs to remain quiet for ten, fifteen, or twenty days, and submit the other, two or three times a day, to the action of the current. The latter will continue to contract, whilst the other will fail to give any contractions when the current is applied to it.

I am anxious to state to you some rules which I consider as important in the application of a current to the treatment of paralysis. You should always commence by employing a very weak current. This precaution seems to me now more important than I formerly believed it to be, having seen one paralytic patient seized with true tetanic convulsions under the action of a current furnished by a single element. Take care never to continue the current for too long a period, especially if it be energetic. Apply the interrupted current in preference to the continued one; but after *twenty* or *thirty* shocks, at the most, allow the patient to have a few moments' repose. Both practice and theory seem to prove, that the interrupted current is more useful than the continued one.

A pile, with Masson's wheel, or still better, the electro-magnetic machine, is the most convenient apparatus for this purpose. Electro-magnetic apparatus are now constructed, in which the interruptions of the current are made without the necessity of an assistant.

We may employ, as conductors, two ribands of sheet lead or copper. The extremities, which are placed in contact with the skin, should be covered with cloth moistened with salt and water. In some cases, it is useful to employ, as extremities of the conductors, acupuncture needles.

The number of authentic cases of paralysis cured by the electrical treatment, is already sufficiently great to encourage physicians and patients to persevere in its use. Perseverance indeed is indispensable in the application of the electric current, for without it, successful results are impossible.

In Tetanus.—The use of the electric current has been suggested in another malady, namely, tetanus. I believe I am the first who has attempted its application to man.

The principles on which is founded its employment for the cure of this disease are the following. A current which circulates by jerks in an animal during a certain time, produces tetanic convulsions; the direct current, if continued sufficiently long, produces, on the contrary, paralysis. From this it was concluded, that the continued passage of the latter, in a tetanised limb, would destroy this condition, by producing a state more or less allied to paralysis. The truth of this conclusion is demonstrated by facts. In operating upon frogs which have been tetanised by narcotics or hydrocyanic acid, we observe a fit of tetanus cease under the influence of the prolonged passage of a direct current. The frogs die without presenting those convulsions, which are observed to take place when these animals have not been submitted to the direct current.

The effects produced by the application of the electric current in a case of tetanus, which I published in the 'Bibliothèque Universelle' appeared to me in some degree to prove the truth of the scientific principles which I have explained to you. During the passage of the current, the patient experienced no violent convulsions; he was able to open and shut his mouth; and circulation and respiration appeared to be re-established. Unfortunately, this amendment did not continue long; the disease being occasioned, and kept up by the introduction of foreign bodies into the muscles of the leg. Perhaps more satisfactory results from the electric current may be expected, in cases where tetanus has not been caused by a traumatic injury. Moreover, we ought already to be thankful in being able to lessen the sufferings to which this dreadful disease gives rise.

[We may add to this, that Matteucci quite negatives the idea of the possibility of the solution of *cataracts* or of *calculi* by means of galvanism.]—*Edin. Med. and Surg. Journal, Jan.* 1850, *p.* 201.

26.—*On the Medical Employment of Electricity in Paralytic and other Diseases.* By Dr. TERZI.—The Italian *scienziati* and *medichi* have, from the period of Galvani and Volta to the present time, devoted much attention to the investigation of the agency exerted upon the animal frame by electricity, both in a physiological and therapeutical point of view. Dr. Terzi, in the first portion of his paper, furnishes an account of the results which have been derived from the labours of Puccinotti, Fario, Berrutti, Botto, Bellingeri, Malinverni, the illustrious Matteucci, and many others who have written upon the subject since the observations made upon it by Müller, in his physiology, rendered a reconsidera-

tion of it requisite. For this, however, we have no space, and must content ourselves with a brief notice of the author's own contribution.

His mode of employing electricity varies with the object he has in view, and to an extent, perhaps, that may be considered somewhat fanciful. When he wishes to produce a chemical or chemico-dynamic, rather than a dynamic action, he employs Volta's, Wollaston's, or Daniell's pile : and the more intimately he desires to effect the chemical organism, the smaller is the pile, and the fewer elements does it consist of, so that a very feeble current is induced. This mode, he says, is further advantageous by enabling us to introduce into the economy certain medicinal substances appropriate to the nature of the case, by suspending them in, and uniting them with, the conducting fluid employed. When he wishes to produce an almost exclusively dynamic action, he prefers the cylindrical machine, or Leyden phial.

In cases of sensorial paralysis, in which the skin has lost its tactile sensibility, he brings the conductors into immediate contact with it, and directs the currents from the lower to the superior parts, this being the direction in which the sensorial impressions operate. In those of motor paralysis, he carries the currents into the substance of the muscles, by transfixing these with fine steel needles, which are then brought into inter-communication with each other, and with the conductors, by means of a delicate wire, and the current directed from above downwards. In order, sometimes, to produce a temporary perturbatory effect, the direction of the currents is reversed. One advantage of this electro-acupuncture is the facility it affords of especially operating upon certain muscles, instead of upon the fleshy mass at random. Thus accordingly as the flexors or extensors may have become inert, the needles are passed into either, and movements of flexion or extension induced. These movements can be maintained during a brief period, the muscles undergoing an almost tetanic contraction, and palpitating as it were under the electric influence. When the continuous current is furnished by a very small number of elements, and directed to the extensor muscles of a limb, whose flexors are powerfully contracted, this contraction temporarily disappears, the limb remaining very flexible in all directions.

Dr. Terzi relates several cases in detail, in some of which a complete cure, in others amelioration, was procured. We may mention the chief particulars of some of these. The first was a case of *paraplegia, with atrophy of the muscles of the legs, and anchylosis of the tibio tarsal articulations*, and occurred in the person of a girl, æt. 19, who had been first seized about six months before with difficulty of deglutition; the whole of the voluntary muscles after a while became paralysed ; and notwithstanding active antiphlogistic, revulsive, and antispasmodic treatment, little amendment ensued. At the commencement, some *engorgement* of the medulla was supposed to exist ; but however this might have been, when the author was desired to undertake the electrical treatment of the case, he regarded it to have assumed the intensity and conditions of a primary neurosis, in obedience to his physiological views, which lead him to believe that the nerves participate in the possession or generation of that power, at all events under certain circumstances, of which they are usually merely the conductors. This induced him to

encourage the patient by a sanguine prognosis. He considered the indications of treatment to be threefold. (1.) To obviate by frictions, and well-regulated gymnastic movements, the atrophy, as far as it depended upon inaction and impaired circulation. (2.) To stimulate separately the activity of the spinal marrow, and of the nerves of the lower extremities, by a gentle current or slight shocks. This was effected as regards the medulla by passing a long needle between two of the vertebræ at the upper part of the spine, and another between two at the lower, and bringing them into inter-communication with each other and the pile, connecting the positive pole with the upper needle. For the limbs, a greater number of needles were passed into the substance of the muscles. (3.) To bring the respective parts into a unison of action, by directing shocks rather than a current from the spine towards the limbs, previously connected by needles. He commenced with a very feeble action, produced by a few pairs of plates, adding to the conducting fluid strong infusion of arnica and valerian ; and as he desired an increase of activity, augmenting the number of plates, and adding vinegar to the infusions, until he reached fifty pairs of large plates. When the electricity was employed in the form of a gentle current, the sittings lasted forty minutes, but when shocks were arrived at, only thirty minutes ; and at every sixth or seventh day, a day or two of rest was allowed. It is a painful procedure ; but the girl, full of courage, bore it well, and was rewarded by a perfect cure. The steps are too long to detail ; but we may state that, after forty days, the treatment was suspended (though great improvement had been achieved), on account of the coldness of the season, to be resumed again in the summer ; when, after twenty-five other applications, the cure became complete.

The *second* case was one of very recent *hemiplegia,* occurring in a man æt. 35, a subject of pellagra. He was treated for a supposed hyperæmia of the cerebro-spinal axis without benefit, and then submitted to Wollaston's pile for about a month, which sufficed for his complete restoration. This case confirmed Prof. Mariannini's view of the great efficacy of electro-acupuncture as a means of acting on the *morale* of the patient ; for the man, previously in deep despondency, now conceived the highest hopes of cure, which doubtless co-operated in its production. The third case was one of *facial paralysis,* coming on in a man (æt. 30) given to venery, and preceded by disturbance in the head. After antiphlogistics and derivatives had been tried in vain, the conductor from the positive pole was brought in contact with the skin, sometimes at the angle of the jaw, and sometimes at the external meatus ; that attached to the negative pole, sharpened into a fine point, being carried in the direction of the paralysed muscles. Slight but frequent shocks were thus transmitted, during half an hour, for fifteen days, soon after which all traces of the disease disappeared.

A case is detailed to show the efficacy of electricity in *constipation from intestinal paresis.* It occurred in the person of a lad (æt. 11), who also suffered from glossoplegia, and a paralysis of nearly all the voluntary muscles of the trunk and limbs. Defæcation was sometimes involuntary, and at others only producible by violent drastics. In spite of the best treatment, the paralysis had been stationary for some years.

When the author saw him, he had not had a stool for fifteen days, and all purgatives were vomited and glysters returned. With the view of exciting the suspended peristaltic movements, the conductor from the positive pole of a pile was brought in contact with the tongue, and that from the negative, previously covered with a thin piece of cloth, carried into the rectum. The patient could not tolerate the sensation in the rectum until the pairs of plates had been reduced to eight, when a current was passed in for twenty minutes. Very obvious movements were induced in the abdomen, and were followed by pains, but no stools. Repeating the galvanism next day, very severe pains were excited in ten minutes; and by the aid of a glyster, an abundant discharge of fæces procured.

Besides the above, he relates four cases of *hemiplegia, with glossoplegia,* in which great amelioration was produced, but not a cure, in consequence, apparently, of an insufficiently long perseverance on the part of the patient. In two other cases of *hemiplegia,* no amelioration resulted. In both, the paralysis followed severe attacks of apoplexy; and the author's experience agrees with that of others, in demonstrating that, when the brain has been seriously and primarily compromised, and the use of electricity long delayed, the progressive improvement and complete cure obtainable in other cases is never to be expected.

A case of *bronchocele* was likewise successfully treated by electro-acupuncture. The number of plates employed amounted to from sixteen to twenty, and upon the intervening discs of cloth, moistened in an acid or saline solution, a little *tinct. of iodine* was dropped. The tumour at first became painful, and increased in size, but soon after diminished. In two cases of *nervous amaurosis,* he tried the effects of continuous currents, as recommended by Prof. Finella, but with no conclusive results. *Bulletino delle Scienzi Mediche.—Brit. and For. Medico-Chirurg. Review, April* 1850, *p.* 558.

27.—*Case of Hysterical Paralysis Treated by Electricity.* By —— Balman, Esq., Liverpool.—[Mr. Balman's patient, a young lady 16 years of age, had been treated for three years for curvature of the spine. At first it appears to have been lateral, but subsequently angular curvature came on. In the summer of 1849, Mr. Balman first saw her, and thus describes the case:]

On entering her room I found her sitting on a sofa, looking pale, but otherwise presenting no striking indication of ill health: her attendant said she had been unable to stand, walk, or speak, since the fit of the previous day. On examination, I found the spine very crooked, with an angular curvature of the two last dorsal vertebræ: on passing my fingers down the median line there appeared to be distinct tenderness both between the scapulæ and over and around the seat of the projecting spine, extending down to the sacrum; the feet were cold, livid, and completely insensible to the prick of a needle, as far as the knees; the hands were in a similar condition, but the loss of sensation did not ex-

tend beyond the wrists. Although unable to stand or support the body for a moment without assistance, I soon afterwards learnt she was enabled to turn the feet about in almost any direction when lying down in bed; her nights were restless, and without sleep, and the eyes presented that peculiar glistening aspect so characteristic of hysteria. She complained of headache, and cramps over the whole body: these were rendered very distressing by cold and pressure of every kind; even a very powerful liniment served but to renew the cramps and destroy all sense of feeling on being applied to any part of the body. I very soon had an opportunity of seeing her in one of the paroxysms, which now generally occurred about once in every twenty-four hours: these, as in similar cases of this mysterious disease, were truly frightful to witness; the legs extended, and rigid as marble, hands clenched and immovable, the head and neck thrown back, whilst the whole body appeared to be convulsed and writhing under the most violent tetanic spasms. Sometimes the symptoms for a time assumed a different character, and she would lie motionless in one position for hours together, in a state more resembling catalepsy than anything else.

The catamenia did not appear more than once from May 1847 to May 1848; from this day she continued to menstruate regularly every three weeks, always more profusely than usual. Leucorrhœa, which so frequently precedes and accompanies these cases, set in about Christmas 1848, and continued gradually to increase up to the time of the first paroxysm of hysteria: this appeared a not very unimportant symptom, as tending to throw some light as to the exciting cause of the disease: it is at all events evident that the severity of this complication corresponded very closely with the gradual deterioration in her health about this time: and on inquiring more particularly into this matter, I find that she suffered so much inconvenience from this cause as to oblige her for some time before the attack to discontinue her usual morning exercise; and latterly even a few turns in the garden caused so much exhaustion that she very frequently fainted after coming in.

I commenced the treatment with the usual routine of antispasmodic and tonic medicines, such as ammonia, iron, fœtid gums, &c., without much apparent benefit: opium was administered at night to soothe the irritability of the nervous system and induce sleep, but without success; three grains of solid opium given at bed-time served only to make her still more restless, without any narcotic effect being produced whatever.

Sept. 6th.—After one month's trial of these and a variety of other remedies, finding matters but little improved, the pain in the lower part of the back being constant, and the severity of which I was inclined to think contributed in a great measure to renew the fits, whilst the paralysis, if it may be so called, remained stationary, I began to think that there must be some irritation of the spinal cord or its membranes. I now, therefore, applied seven or eight cupping-glasses along the whole of the spine every alternate day; prescribed small doses of the hyd. c. cretâ and carb. of soda every night, and a turpentine enema every third morning: on one occasion I ventured to apply the scarificator, and took away about three ounces of blood, with evident relief. Under this mode of treatment she began steadily to improve: headache much reliev-

ed, and the pain and tenderness of the back not so urgent; she also soon passed better nights, sleeping three or four hours together soundly: the attacks returned on two or three occasions afterwards, always just before the approach of the catamenia. The lower extremities, however, continued useless, and without any return of sensibility, and she had as usual to be carried by her attendant from room to room. I now commenced to apply galvanism, with a view of restoring the use of her limbs: at first the shock of a very powerful battery was not felt on placing one pole to the sacrum and the opposite one to any part of the leg below the knee, but after a few trials I found one isolated spot, about the circumference of a shilling, over the outer part of the tibia, a few inches below the knee, sensitive to its effects. Continuing its use every day the feeling seemed to radiate day by day downwards, over the whole of the external part of the leg to the ankle; the inner part of the leg remaining as before completely unaffected by the electric current: the sensibility, however, soon returned here likewise, and extended gradually to the extremity of the second toe: immediately after the next séance I learnt with satisfaction that soon after my leaving the room my patient got up very coolly and walked across the room, and indeed over the whole house, unattended or supported by any one. This happened on the 12th of October, since which she has continued to take regular walks out of doors for considerable distances, and is rapidly improving in all other respects.

Remarks.—My first impression on seeing this case was that it was nothing more than hysteria, and the loss of power over the lower limbs was simply one of those protean forms which this disease sometimes assumes. This opinion was in some measure strengthened by the fact that she had, a little time prior to my being requested to see her, suddenly lost all power of her limbs, and as suddenly regained their use. That the paralysis was not due to caries of the vertebræ, or any serious organic lesion of the cord, appeared to me evident, from the entire absence of any constitutional symptoms to indicate such a state of things: for the body was plump and well nourished; the limbs, although useless, were firm and resisting: and she was enabled, as I have said, to turn them about almost in any direction when lying down. Moreover, there was a perverted or morbid state of sensibility of the cutaneous surface of the entire body (which, I should suppose, would not be the result of any local injury of the cord); so much so, that pressure and friction of any kind appeared to extinguish at once all sense of feeling. Even a strong liniment had precisely the same effect.

Not succeeding, however, with the usual routine of remedies in producing much improvement in my patient's health, but in some respects losing ground, the numbness and loss of sensibility of the limbs increasing, whilst the pain in the back was in no way diminished, I was led to believe that there must be some functional derangement of the spinal cord or its appendages, arising from some cause or other, and that the symptoms resembled, in many material points, the somewhat obscure, but not less interesting class of cases described by the Messrs. Griffin, Teale, Burns, and others, under the head of Spinal Irritation. My conclusions were drawn, as they sometimes must be in studying the

diversified and often complex phenomena exhibited in this particular class of diseases, from watching the effects of the remedial means and appliances employed. Our treatment of many of these cases must, therefore, to some extent, be empirical, until morbid anatomy is found to reconcile more closely the relation of many of the anomalous symptoms presented in this disease with some precise pathological lesion after death.

As regards the actual seat of the disease, it in all probability was connected with some congested state of the spinal veins; and, indeed, it does not seem very difficult to imagine why this state of things should occur if we carefully examine the anatomical arrangement and structure of the venous system of the spinal cord. Thus, according to Breschet, there is everything here calculated to favour stagnation of blood. 1. The veins are deprived of valves, thinner, and much more delicate than in any other part of the body. 2. They are relatively very numerous, subdivided, and tortuous; so that each spinal nerve may be said to be literally encircled and bathed in venous blood, as they penetrate in the intervertebral foramina. The consequence of this arrangement, notwithstanding the frequent communications by which this impediment is in some degree obviated, must be that the blood will move more slowly and with greater difficulty. That congestion does sometimes happen from this peculiar disposition of the veins of the spinal axis, must, therefore, be extremely probable. Ollivier mentions that he had often found in his dissections fibrinous clots blocking up and distending the veins of the spinal cord, and even those which accompany its nerves; and many other instances are related by Morgagni.

The influence of galvanism in restoring the power of locomotion was certainly more remarkable than anything I have before witnessed. That this was in reality the result of the galvanic stimulus, and not, as we know is sometimes the case, by some sudden moral impression unloosing the magic web, which seems to hold captive the power of volition,—I think there cannot be the least doubt. The effect of this agent was perceptible at each application; and it was not until the remedy had been persevered with for some time that the beneficial results were manifested so strikingly.

To show how powerful is the operation of electricity in stimulating directly the voluntary muscles, I may add that she felt, as she often expressed, a strong inclination to walk after each séance; so much so, that she many times made the attempt, but always without success, falling thump upon the floor, until the period mentioned; and even then, when she had regained the power of standing in the erect attitude, it required much determination to keep it; and but for the exercise of a series of Terpsichorian movements, she feels convinced that she would not have been able to have retained her position.

I may mention that I made trial of this remedy at a much earlier period in this case without observing any benefit; on the contrary, many of the symptoms appeared to be aggravated after its use. It was, therefore, at a particular stage of the disease, when counter-irritant and alterative medicines had removed the more active symptoms of the complaint, that galvanism appeared to do good. This remedy, therefore, like any other, is applicable only under certain conditions; and the

success of it will depend not only upon the tact and acumen of the practitioner in the selection of his cases, but also the particular phase of the disease at which its use is apparently indicated.

It was the *secondary* current of electricity which was employed throughout; an important fact in its bearing upon the statements lately put forth upon the value of the primary current only, and the inutility of the secondary.—*Med. Gazette, Jan.* 25, 1850, *p.* 157.

28.—*A Case of Hysterical Paralysis.* By W. Thorn, Esq. London. —Mrs. W., a married woman, aged forty-three, having three children, the eldest twenty-one, the youngest about ten, a waistcoat-maker by trade, of a leucophlegmatic appearance, and highly nervous temperament, and subject to occasional fits of hysteria, globus hystericus very troublesome, summoned me to attend her on the 2nd of June, 1848. I found her in a state approaching collapse, breathing extremely difficult, almost amounting to asthma, and which she supposed was brought about by the sudden news of the death of a sister, aged forty-eight, from phthisis. She was in a few days recovered from this state by opium, aperients, sinapisms, and a blister, dressed with savine ointment, and the menses returned on the 23rd, without anything particular to remark.

I ascertained, that for the last twenty years she had suffered from prolapsus uteri, appearing externally, unless supported by a broad ring pessary, which she had worn for about seven years; as it did not afford efficient support, I advised the substitution of sponge, which answered much better, and was withal more cleanly; there was some leucorrhœal discharge, which materially diminished when the sponge was introduced, soaked in a mild astringent solution. There was no ulceration of the neck of the uterus.

On the 29th of September, 1848, Mrs. W. experienced her first attack of paralysis, which came on without notice, and lasted three weeks; all the limbs were paralysed, as also the bladder, and there was great determination of blood to the brain. This attack was got under by the application of a few leeches behind each ear, and a relay on the temples, blisters the whole length of the spine, and pills containing the twelfth of a grain of strychnine every three hours. On recovering from this attack, a seton was inserted in the back of the neck, in the hope of preventing another; the futility of which was evidenced by the second paralytic attack, on the 28th of November following, which, lasting fourteen days, was extinguished by the application of leeches to the lumbar region of the spine; blisters and pills as before. The general health was now particularly attended to, iron and quinine was given, and the appearance of the patient much improved, but the third attack came on, December 19th, lasting about nine days; it was removed by blisters and pills as before; the electric shock, and a strengthening plaster to the spine.

Mrs. W. was now free from an attack until January 27th, in 1849, when complete aphonia came on, (after severe globus hystericus,) which

lasted three weeks, but was at length removed by stimulating gargles, application of tincture of iodine to the throat externally, and a blister to the nape of the neck. Shortly after this, a violent attack of headache, with considerable determination of blood also, was removed by leeches once more behind the ears.

The menses never ceased, but were indeed quite regular to the day; occasionally there were pains of a bearing-down kind, which were only relieved by large doses of opium, followed by aperients.

Mrs. W. continued tolerably well from January (having gone to the country the latter part of the summer, for a week or two only) down to October 24th, when she was again paralysed for eight days. Blisters and pills as before; the left arm and hand, having remained two days longer motionless this time than the other limbs, was recovered by another blister between the shoulders.

There was this month (November) another slight attack, of six days' duration, which yielded to the same treatment, and Mrs. W. remains at this writing convalescent, taking, however, tincture of muriate of iron, and a pill to regulate the bowels, which are generally constipated, more, perhaps, from a sluggish disposition than from any defect in the biliary secretion. I had forgotten to mention that the bladder was paralysed in every attack, and of course the catheter had to be used. Suspecting at first that these attacks of paralysis arose from that peculiar hysterical temperament which gives rise to so many Protean forms of disease, I gave as purgatives generally turpentine and castor oil, and in one attack I thought the power of the bladder and limbs seemed to return earlier in consequence, but in the last two attacks these remedies seemed of no service, and the blisters had to be repeated to produce a beneficial effect. I must also state, that in the last attack a mild epileptiform convulsion came on, and the tongue was slightly bitten, no one being at hand to prevent the mischief.—*Lancet, Dec.* 22, 1850, *p.* 660.

29.—*A Case of Idiopathic Tetanus Treated by Galvanism.* By H. Hailey, Esq., Newport Pagnell.—[In this case the patient was a boy twelve years old, in whom the exciting cause of the attack appeared to be the prolonged use of a cold bath, after walking rapidly, on a very hot day. On the 14th of July, three days after the attack, when Mr. Hailey saw him, the symptoms were extremely well-marked, and the patient's sufferings very severe. He was treated by the exhibition of active cathartics, large doses of opium, sinapisms to the spine, stimulant enemata, &c., and the administration of brandy and beef-tea was not omitted; but up to the 17th without any improvement. Upon this day, Mr. Hailey tells us,]

I administered several rather strong shocks from an electro-galvanic apparatus; first along the spine, then over the masseter muscles, and then in the course of the great sciatic nerves. This appeared to cause great pain through the whole system, and at first brought on the convulsions much stronger. The opium was discontinued altogether. In the course

of a few hours he appeared more calm, took a mixture of beef-tea and brandy, and the bowels not being acted upon in the evening, I prescribed another enema of castor oil and turpentine.

18th. Has passed a better night. Convulsions less frequent. Has passed more urine. Bowels relieved. The galvanism was again administered; and, in giving a shock in the course of the great sciatic nerve, he moved the right leg, and afterwards said he could for the first time feel it. A short time after its administration to day, to the surprise of his friends, he got up in bed and asked for something to eat, but, before it could be procured, he fell back as rigid as heretofore. I ordered the abdomen and legs to be again well rubbed, a blister over each masseter muscle, and on each side of his spine over the region of the cervical plexus.

19th. Has slept better. Convulsions less frequent. Has taken more nourishment. Pulse small, feeble, 120. Bowels relieved. The blisters having risen, I applied galvanism over each masseter muscle, and over the blisters on the spinal column; ordered the blisters to be kept open, and brandy, gruel, beef-tea, or port wine to be administered when an opportunity occurred, and a blister to be applied over the loins.

20th. Has passed a better night, the paroxysms having occurred only twice during that period. Can open his mouth wider, and has eaten a small piece of pudding. Bowels constipated. Galvanism to be applied over the same parts as yesterday, and, in addition, on the blisters in the lumbar region.

21st. Has passed a good night, not having had more than two convulsive fits since yesterday morning. Can raise his legs, and slightly move his back; can open his mouth wider. Bowels constipated, and still very hard. Has masticated a little chicken. Ordered him ol. ricini, ℥ss. to be taken directly, and quin. sulph. gr. ij. to be put upon the tongue every four hours, and the galvanism to be applied over the same parts as yesterday.

22nd. Continues improving. To continue the same treatment as yesterday.

23rd. Much better. The bowels have acted spontaneously. Has slept well, and had but one convulsive fit in the course of the night. Can masticate his food. Ordered him out of bed for two hours, and to continue medicine and galvanism as before.

25th. Much better. Can stand on his legs with a very little support. Continue medicine and galvanism.

27th. Much better. Bowels softer. Pulse between 80 and 90, and stronger. Bowels continue to act without the aid of medicine. Ordered him to continue the galvanism, and to take a tonic mixture of sulphate of iron and quinine.

30th. Has been out for a ride. Appetite very good. Can masticate his food well. Has had no convulsive fits for the last two days. Pulse 80, and strong.

August 7th. Is able to walk about as usual, with the exception of complaining of great weakness of the legs and soreness of the feet. Has discontinued all medicine.

From this time he daily improved, having no return of the convulsions, and, by September 1st, was able to follow his usual avocations.

The chief interest in this case consists in the support which it affords to the humoral view of the pathology of tetanus put forward by Dr. Todd in the Lumleian Lectures, published in the Medical Gazette last year, and in the influence of galvanism in reducing the tonic convulsions.

As in many other cases of idiopathic tetanus, the disease seemed to originate in exposure to cold, and a sudden check to the perspiration,—causes very favourable to the depravation of the blood.

The great exertions which the patient made in walking would, no doubt, largely contribute to determine the influence of any morbid matter accumulating in his blood, upon the muscular and nervous systems.

The application of galvanism,—a mode of treatment suggested some years ago by Professor Matteucci, of Pisa,—seemed to have a very beneficial influence. It was administered on the seventh day of the attack, when the disease was quite at its height: immediately after its application, the symptoms began to abate, and the rigidity of the muscles and the convulsive attacks diminished steadily each succeeding day; and it is worthy of notice, that simultaneously with the application of galvanism all opiate medicines were discontinued.—*Med. Gazette, Feb.* 22, 1850, *p.* 324.

30.—*Case of Traumatic Tetanus, unsuccessfully treated by Chloroform.* Under the care of SAMUEL SOLLY, Esq., Surgeon to St Thomas's Hospital.—[This patient was a bricklayer, 50 years of age, whose left hand was severely crushed by a fall of bricks. Notwithstanding the accident, he continued at his work for a few days, until gangrene occurred, involving the fingers up to the second phalanx. He then applied at the hospital, and the fingers (except one which had suffered less than the others) were amputated. In a clinical lecture on the case, Mr. Solly said:]

A very good lesson might be learned from the manner in which the present patient's hand was dressed when he was admitted. Straps had been rather tightly applied, aided by some turns of a roller. Now, in such cases, (the man had refused amputation,) it is far wiser to dress the part very lightly, and to give it support, as the effects of pressure in such lacerations must of course increase the tendency to disorganization and sloughing. In idiopathic gangrene, the line of demarcation should always be waited for, and nature be allowed to limit the work of destruction; but in traumatic cases such a delay is of course unnecessary. That the gangrene must partly be attributed, in this case, to the patient continuing his work for five or six days after the accident is obvious; for it is a well-known fact that the muscular system of one arm sympathizes with that of the other; and no good results can be obtained, if both be not kept at rest. In the removal of fingers, it should be a rule to save the heads of the metacarpal bones, with working men; for the breadth, and a certain amount of the strength of the hand, are preserved; whilst with persons who do not obtain their livelihood by manual labour, the metacarpal head should be removed, so

that the lateral compression may give the hand a better appearance.—Twenty-four hours after the operation, the patient complained of slight pain in the throat. This was soon followed by difficulty of swallowing, and stiffness about the jaw. Mr. Solly immediately ordered a blister down the whole length of the spine, a sinapism to the throat, a tobacco enema, and a poultice to the wound. The next day risus sardonicus appeared, the jaw was stiffer, pain in the back set in, and the existence of tetanus could no longer be doubted. Another tobacco enema and calomel and opium were now administered. Soon, however, there was complete opisthotonos, the mouth could not be opened; pulse 140; diaphragmatic breathing, and intercostal muscles in a state of complete spasm. Chloroform was now applied to the surface denuded by the blister; it caused much burning, but considerably diminished the pain in the back; it had no effect on the rigidity of the jaws, but lessened the risus sardonicus. The chloroform was subsequently applied by the same method over the pterygoid muscles, this likewise gave some relief; but it was thought advisable not to continue the anæsthetic, as a whole pint had already been used, by means of which, however, some sleep had been obtained. Mr. Butler, of Woolwich, was lately more fortunate; he succeeded in completely subduing tetanic symptoms in a boy who had run a splinter under his nail, by making him inhale the chloroform for a little while. The results, however, were less happy at St. Bartholomew's and the London Hospitals in similar trials. On consultation it was now decided that the arm should not be removed. Opisthotonos became soon very severe, and the dysphagia permanent, with pulse 136; at this time the finger, which had been spared, was removed, and muriate of morphia applied endermically. This narcotic produced deep sleep, and the patient fell into a comatose state, during which Mr. Dixon opened the jugular vein to relieve the head, though the coma was not looked upon by the medical officers, and in particular by Dr. Bennet, as being connected with the morphia. Death, however, occurred, preceded by slight spasm, thirty hours after the first symptoms of tetanus, the patient having become quite sensible for a short time previous to his decease.

From this case it may be gathered, that pain in the throat is a very early symptom of the tetanic affection. And as its remedial means, we should state, that in this hospital two cases of tetanus recently recovered by the use of tobacco enemata and calomel and opium; and one great point to be kept in view is, to keep up the patient, as far as possible, by the use of tonics. No particular alterations were found on a post-mortem examination, excepting softening of the anterior columns of the cord in the lumbar region. Mr. Solly is inclined to believe that this softening takes place before death, but that it is connected with tetanus, not as a cause, but as an effect; the latter being produced by over action of the nervous and muscular systems; and this conjecture is strengthened by the same appearance having been presented in a case of death by overdoses of strychnine, which lately came under Mr. Solly's notice. This gentleman likewise thinks, that by the aid of the microscope, and close observation, some pathological alteration in fatal cases of tetanus will at last be discovered.—*Lancet, Dec.* 1, 1849, *p.* 584.

31.—*Case of Traumatic Tetanus Cured by Ether Inhalation.* By G. H. Smith, Esq., Pinang, China.—[In this case the symptoms were severe, but of a chronic character, having commenced twelve days before Mr. Smith saw the patient, who was a Chinese. They were ascribed to a wound with a fish-bone received seven days previous. Mr. S. says:]

The case appearing one favourable to testing the anti-spasmodic powers of chloroform, a teaspoonful and a half of that fluid (prepared according to Dumas's formula, specific gravity 1490), poured on a handkerchief, was applied to the mouth and nostrils. In a very short time it took effect, and exhibited its influence over the disease in reducing the tension of the muscles of the lower extremities; at the end of two minutes its full operation was produced; there was complete insensibility to pain, a needle thrust into the flesh causing no indication of that—indeed, the patient expressed himself all the while as "feeling very easy;" the muscles of the face and neck were partially relaxed, the head could be turned a little from side to side, the jaws separated for a short way, and all the extremities moved with freedom. When the patient was raised, he maintained the sitting posture, but the spine still preserved its stiff and bent appearance. The pulse was but little affected.

The relaxation thus produced gradually subsided, and in two hours the tetanic symptoms had all returned as strong as ever. The chloroform was repeated with like effects and results.

I now determined on trusting to this agent, but at the same time to endeavour to bring the system under the influence of mercury, and also to use any other auxiliary means likely to afford relief and promote cure. Having only a small quantity of chloroform, ether was substituted for it.

Five drachms of rectified ether, poured into a large bladder, mounted with a common bone pipe, introduced into the mouth through the space left open by the dislodged incisors, were inhaled morning and evening. Ten grains of calomel were administered twice a day; the body was immersed in warm water, to cleanse it of the impurities with which it had been smeared; and one drachm of mercurial ointment was rubbed in, daily, over the groins and armpits. The bowels, which were very obstinate, were occasionally opened by three or four drops of croton oil, or by a draught composed of infusion of senna, tincture of jalap, and extract of elaterium; and a belladonna plaster was applied along the spine. Morphine draughts were given for the first few nights, but discontinued, as they failed to produce sleep.

In a very few days there was evident improvement. The tension and rigidity of the muscles of the extremities first gave way; then of those of the neck and face, the power to open the jaws slowly, but gradually, increasing: and next of those of the back, which last, however, continued somewhat stiff and painful for a considerable number of days after the disease had disappeared from other parts; and it was also remarked that the right (the wounded) side remained weaker, and longer liable to twitchings, than the left side. The cure progressed almost uninterruptedly, though the patient fell off rapidly in flesh; and on the 12th of May his pulse became so perceptibly weaker, that he was allowed a

glass of sherry and a basin of soup, daily, under which he, in a few days, began to gather strength.

He was very soon got under the influence of the mercury; on the 11th of May, his mouth being affected, the calomel and ointment were discontinued. At the commencement of the treatment, five drachms of ether were required to produce a full effect; but as the symptoms declined, a less quantity, or four drachms, was found sufficient; and the last dose, only three drachms (June 15th inst.), produced such a powerful effect, causing so great a degree of stupor and prostration, as to create some alarm. The inhalation was supposed carried far enough, when the respiration became short and hurried, the eyes staring, and the arms dropped by the side. From the 4th to the 22nd of May the inhalation was repeated twice a day; from the 22nd to the 28th, once daily; and from the last date to the 15th of June, twice a week; when it was altogether discontinued. After every exhibition, the patient expressed immediate relief. On the 14th of the month he was able to rise without assistance; on the 18th he could walk a short way, with the help of a stick; and on the 23rd he was able to move out of doors. After this date he gained strength rapidly, and now (the 18th of June), is quite recovered. The ether was persevered in so long, on account of the slight pain and stiffness experienced in the loins, and the twitches felt during progression in the tendo-Achillis of right side.

The patient became exceedingly fond of the medicine; the taste for it seemed to grow upon him; he watched for the hours of its administration with impatience; he inhaled the vapour with great vigour—especially towards the last; and sometimes it required considerable force to withdraw the pipe. It was truly ridiculous to witness the craving he at times evinced for it: he would open and shut the mouth, with a forward motion, as if attempting to follow and seize the pipe; and frequently solicited a repetition of the dose in the most pressing manner.

It was very curious to observe the different effects of the ether on this man at different periods of his cure. At first the whole power of the medicine seemed expended in reducing the muscular tension, insensibility to pain and some degree of stupor being the only additional symptoms; but as the disease gave way, the effects produced on the mind increased, whilst those on the body became less marked. The artificial disease produced, if it may be so termed, was marked by three distinct stages—first, extreme nervous and muscular prostration: second, reaction, with more or less mental excitement and delusion; and third, a slighter degree of prostration, or a feeling of fatigue, and desire for repose.

In the first stage there was flushing of the face and a peculiar expression of countenance, between that of moroseness and vacancy, followed, in a few moments, by a death-like paralysis of the whole frame, which comprised this stage, and continued for a minute or two.

As the second advanced, the patient sat himself up erect, looking wildly about, and then, either remained quiet, keeping his eyes steadfastly fixed on some point or other, or, as was the case more frequently, commenced moving his body about in a variety of ways. Sometimes he would swing his head and body round and round with great rapidity, and the explanation given for such a feat was, that he supposed himself

suspended in the air;—at others he would stoop down and execute movements with his hands, (not unlike those of a dog scraping at a rat-hole), calling out the while "Allah zullah ada zakan,"—which, in English, means, "God is pressing him down;" and he often also, during this stage, expressed great alarm, and, among other strange fancies, supposed "the world was at an end," and that "he saw his father, mother, and other friends," who had long since been dead. He was suspicious of strangers, and very impatient of their presence, sometimes abusing them in no measured terms, and on such occasions displayed no contemptible knowledge of the various languages spoken in the East,—Siamese, Chinese, Malay, Kling, Hindostanee, &c.;—but his friends he never forgot, and would cry and caress them, upon any attempt being made to deceive him in respect of them. It was very remarkable, that if roused, and if his attention was forcibly recalled to some previous subject, especially one in which he had much personal interest, he would converse to the point, and very rationally too. The singular features presented by this case, I confess myself quite unable to expound; the case, however, exhibited many other peculiarities, but I have related enough, and perhaps more than will be credited.

The langour and prostration which succeed and form the third stage, usually induce the patient to seek relief in an hour's repose.

In conclusion I would remark, that Attong is a very quiet, industrious man, and a very intelligent one of his class. He does not smoke, and never was an opium smoker.—*Lancet, Dec.* 22, 1849, *p.* 667.

32.—*Case of Traumatic Tetanus Treated by Strong Voluntary Action of the Respiratory Muscles.* By M. CRUVEILHIER.—[The following case is from Cruveilhier's work on Pathological Anatomy.]

As physiological pathology has taught us that death takes place in tetanus, when the spasm attacks the muscles which preside over respiration, deglutition, and phonation, one is tempted to enquire whether it would not be possible to substitute for the convulsive contraction, a voluntary, permanent, and energetic action of these muscles. Such was the thought which directed me in the following case.

[The case was one of a peasant who laboured under tetanus produced by the forcible separation of the thumb from the hand.]

The patient was young, and full of life and courage, and I ventured to assure him of being cured if he submitted to my orders. I placed myself before him, and instructed him to respire in a measured time, making as deep inspirations as possible. To direct him in this fatiguing exercise, I beat before him the measure *à deux temps*. During an hour there was no attack of suffocation or strangulation. My place was taken by assistants, who relieved each other, and at the end of four hours, the patient fell into a profound sleep. On his waking, the same system was recommenced, which was again followed by sleep. After the suspension of this treatment, there were slight exacerbations, but they speedily gave way, and he was completely cured.—*Dublin Quart. Journal, Feb.* 1850, *p.* 172.

33. —*Treatment of Chorea by Prussiate of Iron.*—M. Faivre d'Esnans mentions in the Journal de Médecine et de Chirurgie Pratiques, that he has obtained the happiest results from from the prussiate of iron in chorea and epilepsy, and he gives several cases where the cure was obtained in between four and eight days. He uses the following formula:—Prussiate of iron, fifteen grs., extract of valerian, forty-five grains; make twenty-four pills. One pill to be taken three times a day, at six hours' interval, each pill to be followed by a wine glass of infusion of valerian. The author was induced to try the prussiate of iron, from having seen M. Jourdes use it, at the military hospital of Strasburg, for intermittent fever. As he considers that both diseases (chorea and ague) have their seat in the medulla spinalis, he thought that the same remedies would prove efficacious in both complaints, in which supposition, according to his statements, he was not deceived.—*Lancet, April* 6, 1850, *p.* 413.

34.—*On the Functions of the Pneumogastric Nerve.* By M. Longet. —The following is M. Longet's summary:—

1. From its origin, as far as the superior jugular ganglion, the pneumogastric is exclusively a nerve of sensation.

2. The stimulation of its proper fibres, at their extremities, has especially the effect of inducing the reflex movements of deglutition, chymification, circulation, and respiration. At the same time, it would be a serious error to suppose that, if the excitor influence of these fibres were cut off, the reflex motor actions would necessarily be abolished.

3. Below the superior jugular ganglion, the trunk of the pneumogastric represents a mixed nerve, exercising a motor influence, voluntary on some organs, involuntary on others. The voluntary power it owes to its *direct* motor fibres; the involuntary, to the the *indirect* before enumerated.

4. The sources of innervation required to maintain the function of an organ, are multiplied in proportion to its physiological importance. Thus the organic movements of the lungs, heart, and stomach, are influenced by motor fibres coming from numerous points of the nervous system. It is the same with the movements of deglutition, and with the respiratory dilatation of the glottis.

5. The anastomotic branch of the spinal accessory, which, to the exclusion of every other nerve, presides over the vocal movements of the larynx, only represents a *partial motor root* of the pneumogastric.

6. It is neither correct nor rational to conclude that, because, in the absence of this anastomotic branch, the phenomena of respiration, circulation, and digestion, continue in animals, the pneumogastric nerve must be mixed at its origin. The internal branch of the spinal accessory is only one of the sources through which the trunk of the pneumogastric receives motor filaments from the cerebro-spinal centre.—*London Journal, Feb.* 1850, *p.* 185.

DISEASES OF THE ORGANS OF CIRCULATION.

35.—ON THE COMPOSITION OF THE BLOOD.

By Dr. H. Bence Jones, F.R.S., Physician to St. George's Hospital.

[The object of Dr. Jones in the following remarks is, to show the relation of the blood "to the food, to the body, and to the urine."]

The blood, like all vegetable or animal food, consists of water, nitrogenized substances, non-nitrogenized substances, and salts, which, when burnt, give ashes.

Any single analysis of the blood is of no value quantitatively. It serves well, however, to show what kind of substances enter into its composition. There is not, nor, indeed, can there be, any standard analysis of blood, to which all others may be referred. The blood has been called an internal atmosphere, and in its constant momentary variations, in its unceasing change, it may well be compared to the atmosphere. Each moment its composition, as a whole, is changing. Each respiration produces its change on the blood. Each time food is taken, a great change in the blood must occur. You cannot add a pound or two of matter to the blood without changing it. Each action of a muscle, or nutrition of any part of the body, must take something from the blood, and thus change its composition. So, also, each excretion from the blood must effect its peculiar changes on that blood, out of which each excretion is taken. These are the broad outlines of the causes of the changes of the blood. The water is always changing. The nitrogenized and unnitrogenized substances are always varying in amount; even the salts, even the alkalescence of the blood, is in a perpetual state of variation; at no two moments of the day is it the same. The quantity, then, of the various substances present in the blood is constantly changing, and the variations in the state of health require to be far more minutely studied than they have been, before deductions as to the variations in disease can be safely trusted.

We have in the blood, albumen, fibrin, blood-globules—all albuminous substances; fat, a non-nitrogenous organic substance; salts; and water.

The albumen, fat, ashes, and water, are the same as existed in the food. The fibrin and the blood-globules are the constituents of the blood, which do not exist in the food. It is the production of these by the blood out of the food, to which the term assimilation must chiefly be applied. The chemistry of this assimilation—that is, the chemistry of the formation of fibrin and blood-globules—is at present almost entirely unknown to us, and therefore it is well called a vital process, and belongs as yet to physiology, and not to chemistry.

In disease, the constituents of the blood undergo various and great alterations in their amount: sometimes some constituent is found to be much increased, at other times much diminished. Tables illustrating these changes you will find in Andral's work on the blood. For the purpose of making the effect of disease very evident, I have chosen out from that work the following analyses, which present the most striking variations, and you will see therefrom how an analysis of the blood might assist your diagnosis in a difficult case.

BLOOD.	Health.	Variation in Disease.	Rheumatism.	Fever.	Anæmia.	Cerebral Congestion.	Bright's Disease.
Fibrin	3	10½ to 1	10	.9	3.5	2.7	3.2
Globules	127	185 to 21	101	93.1	38.5	152.3	82.
Solids of serum	80	114 to 57	90	86.0	89.	105.	64.8
Water	800	915 to 725	799	820.	869.	740.	850.
	1000		1000	1000	1000	1000	1000

In this table the contrast in the amount of fibrin, between the blood in fever and rheumatism is very marked. It shows well also, how high the fibrin is both in anæmia and in Bright's disease; and hence the liability to acute or subacute inflammations in these diseases. In both, although the amount of blood-globules is greatly diminished, the fibrin is increased. In Bright's disease the decrease of the albumen of the serum is very evident also.

It has lately been shown, by Dr. Garrod, that in gouty patients, urate of soda is contained in the serum of the blood. This, although long suspected, from the occurrence of deposits of this salt round and in the joints of some patients, had never been proved to the satisfaction of the chemist. The method I use for obtaining the demonstration of uric acid in the blood is by no means difficult. I have here the blood drawn from two patients in the hospital. The clear serum is poured into a basin, and evaporated at 212° to perfect dryness. The mass is to be reduced to the finest possible powder, and then treated at the temperature of 100° F., with distilled water for an hour; by this means everything soluble in the residuum, is obtained in solution, and the urate of soda being soluble, is dissolved out. The solution is then to be evaporated to a very small bulk, and strong acetic acid should be added. Acetate of soda is thus formed, and uric acid is set free; and in the course of a few, or many hours, according to the quantity of uric acid and the dilution of the mother liquor, the uric acid crystallizes out, as you see it here, on the sides or bottom of the tube. To the eye, the crystals look like small grains of Cayenne pepper; through the microscope they look like some uric acid crystals from the urine; and if a few of them are taken, treated thus, with nitric acid in the usual way, the diagnostic pink reaction is obtained.

Dr. Garrod has very lately detected in the blood a substance which crystallizes in microscopic octahedral crystals. He considers this to be oxalate of lime. But this, and all other statements founded on microscopic chemistry alone, must be received with great caution. (Med. Chir. Trans. 1849.)

Lastly, in the blood of the ox, a substance resembling hippuric acid, in crystalline form and chemical reactions, has just been discovered. (Comptes Rendus, Dec. 24th, 1849.)—*Lancet, Jan.* 26, 1850, *p.* 103.

36.—ON THE EXACT POSITION OF THE ORIFICES OF THE HEART, AND THE GREAT VESSELS.

By Dr. O'B. Bellingham, Physician to St. Vincent's Hospital, Dublin.

Relative Position of the Orifices of the Heart to the Parietes of the Chest.—The right auriculo-ventricular orifice lies behind the centre of the sternum, on a line with the lower margin of the articulation of the cartilages of the fourth ribs with the sternum.

The left auriculo-ventricular orifice lies behind the cartilage of the fourth left rib, near the sternum.

The pulmonary valves are on a line with the space between the cartilages of the second and third ribs, to the left of the sternum, and very close to this bone. In some instances they lie a little lower down,—viz. on a line with the junction of the cartilage of the third left rib with the sternum, and immediately under it.

The aortic valves lie behind the sternum, on a line with the junction of the cartilages of the third ribs with the sternum, and towards the left edge of this bone. When the valves of the pulmonary artery are situated lower down, the semilunar valves of the aorta will be lower also, and on a line with the interval between the insertion of the cartilages of the third and fourth ribs.

The free edge of the semilunar valves of the aorta corresponds accurately, M. Gendrin observes, to the base of the pulmonary valves. A line drawn across the inferior margin of the third ribs corresponds to the base of the valves of the pulmonary artery, and to the free border of the aortic valves.

Relative Position of the Orifices of the Heart to one another.—The right ventricle ascends higher than the left, and the left ventricle descends lower than the right. Hence the origin of the pulmonary artery is on a plane above that of the aorta.

The pulmonary orifice is the highest up, as well as the most anterior, of all the orifices of the heart. The aortic orifice lies behind it, and on a plane lower down. The left auriculo-ventricular orifice is immediately behind the aortic orifice, but on a plane lower down. The right auriculo-ventricular orifice is nearly on the same plane as the left, but more anterior.

Relative Position of the Large Vessels to the Parietes.—Aorta.—The ascending portion of the arch of the aorta comes to the right of the sternum, between the cartilages of the second and third ribs. In this part of its course it is within the pericardial sac, and in the dead subject lies at the depth of one inch and a half from the surface, the margin of the right lung and the pericardium being between it and the parietes of the chest. The transverse portion of the arch of the aorta crosses the trachea at the centre of the first bone of the sternum, on a line with the lower margin of the articulation of the cartilages of the first ribs with the sternum, and at a still greater depth from the surface. The arch of the aorta approaches most closely to the parietes at the point at which the arteria innominata comes off; that is, on a line with the junction of the cartilage of the second right rib with the sternum.

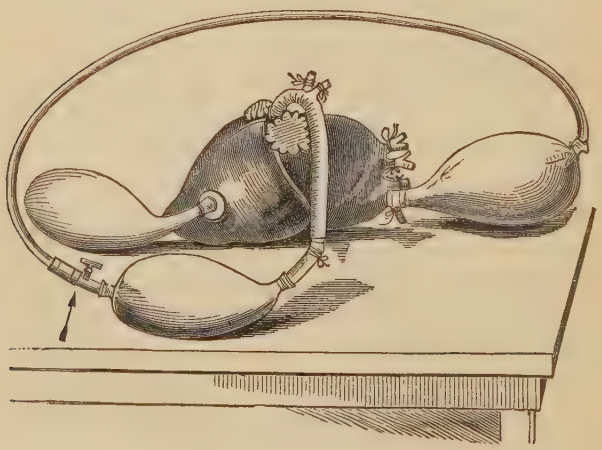
Pulmonary artery.—The origin of the pulmonary artery is on a line with the junction of the cartilages of the third ribs with the sternum; the tip of the left auricle resting against its left side; it ascends about two inches before it divides; and a portion of the margin of the vessel here comes to the left of the sternum, between the cartilages of the second and third ribs. The division of the artery is on a line with the upper edge of the cartilage of the second ribs, where they join the sternum, the apex of the pericardial sac being on a line with the junction of the cartilages of the second ribs with the sternum, though it is sometimes higher up, and on a line with the cartilage of the first ribs.—*Med. Gazette, Feb.* 15, 1850, *p.* 270.

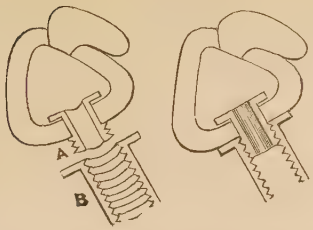
37.—ON THE CAUSE OF THE SOUNDS OF THE HEART.

By Harris C. Brakyn, Esq., Dublin.

[Mr. Brakyn, a Dublin student, having adopted Dr. Billing's theory of the sounds of the heart, invented a very ingenious apparatus with a view of experimentally demonstrating its truth. After exhibiting this apparatus before Prof. Fergusson, Dr. Stokes, Dr. Lees, and many other Dublin gentlemen, Mr. Brakyn communicated an account of his experiment to Dr. Billing in a letter from which the following is an extract:]

I have still preserved in my possession the apparatus used on the last-mentioned occasion, which consists of an ox-heart carefully dissected from the animal, so as to avoid injury to any of the appendages. To this (as displayed in diagram) I attached an apparatus consisting of a flanged





tube, *a*, attached to the middle of left ventricle, and piercing its wall, introduced through the auriculo-ventricular opening, to which was screwed externally another tube, *b*, with a flange also, so as to grasp the wall of ventricle all round the tube, and render the junction air tight; to the outer tube a bladder is tied. A free communication is thus established between the bladder externally and the cavity of ventricle within. To the left auricle, a similar apparatus, but without flanges, was then attached by one trunk of the pulmonary veins, the rest being tied. Then having tied all the offsets of the aorta, I tied a tube and bladder to its abdominal extremity; to the distal end of this a small stop-cock was then tied, into which a brass pipe fastened to the end of an india-rubber one, can be wedged; the other extremity of the caoutchouc pipe is finally attached to the distal extremity of the auricular bladder. There is thus completed an apparatus permitting a mimic circulation through the left heart, (*it* being sufficient for illustration,) which may be conducted with great ease in the following mode. Let the system be inflated with air through the orifice of the elastic tube next stop-cock (marked by an arrow in diagram); when having wedged back the stop-cock into the pipe and opened the cock, a rhythmical circulation may be carried on by alternating manual pressure applied to each of the three bladders in succession (without removing *any* of the *three* hands applied) —thus *representing* the successive contractions of auricle, ventricle, and aorta, with the natural attempts at regurgitation, which close both sets of valves in succession. Hereby a complete imitation of the normal sounds may be produced on either a very magnified or diminished scale, according to the force used in propelling the air.

These sounds being produced without any muscular contraction, or rush of blood, &c., must evidently be *valvular*, which can be further demonstrated by removing part of the apparatus, (the auricular,) so as to show the mitral valves in action synchronously with the first sound; or by introducing a wire cage, prevent them closing on regurgitation, when no sound follows: above all, the first sound is as perfect as the second, the valvular origin of which is, I believe, undisputed. In fine, the illustration, though conducted with air, ought to be conclusive, inasmuch as a suddenly strained membrane, which gives a tympanitic sound in air, will do the same in water also, as I have tried, but not so loudly.

Dr. Stokes, also, in subsequent conversations with me, mentioned a fact which he had noticed several times in typhus fever, and which he seemed to thing likely to favour your doctrine—viz., that patients, after the fever had progressed some time, and great debility had supervened, ceased to have any sound at the heart, though circulation continued. Sometimes, however, the second continued, the first being absent; but it was to be remarked in these cases, that the impulse of the heart was quite absent. This, no doubt, Sir, the muscular theorists would endeavour to appropriate, as well as the supporters of your opinions. I imagine, however, that this additional fact would not be so easy of digestion to the former gentlemen, which is, that as the patients improved, impulse was found to return, often with considerable energy, but unaccompanied for some days by any sounds, or, in some instances, by the second only. This state of things can be also imitated most accurately by the bladder apparatus.

I also endeavoured to try the experiment with water, but did not succeed, for want of a proper hydraulic apparatus of adequate power, which would have been too expensive and laborious an undertaking for me to have ventured on. I should have mentioned before, a fact of some interest in connexion with the character of sound produced by the valves—namely that when the mitrals were made to act whilst exposed to view, the sound could be produced by the sudden straining of the valves, when the ventricular bladder was pressed, even though the valves had been previously in contact, or with a very minute orifice existing by their partial patency, such as in the accompanying diagram.

This fact would seem to me to disprove the statements made in several works of eminence, that the second sound is produced by a click of the sigmoid valves; the first being regarded by such authors as muscular, whilst the above fact must, I think, prove your assertion of both being "tympanitic."—*Lancet, Nov.* 24, 1849, *p.* 554.

[Mr. Brakyn having intimated in the letter from which the above extract is taken, that Dr. Stokes considered his experiment conclusive, the latter gentleman has written to correct this, which, he states, is an inaccurate statement. He says]

I did not admit the conclusiveness of the experiment, particularly with reference to the first sound.

There is another point in Mr. Brakyn's letter which I must take leave to correct. It is, that in cases of softening of the heart in typhus

fever the impulse is found, on the recovery of the patient, to return with considerable energy, but unaccompanied for some days by any sounds, and in some instances by the second only. In the investigations which I have published on the state of the heart in typhus fever, I have shown that in a few cases a returning impulse is perceptible before the development of the first sound; but the statement, that the heart may act with considerable energy for days, without producing any sounds, is altogether opposed to fact.—*Lancet, Dec.* 15, 1849, *p.* 647.

[Dr. S. WILKS, of Camberwell, states that he has repeated Mr. Brakyn's experiment, but without such success as that gentleman met with. He says:]

The second sound of the heart is very conclusively shown to be dependent upon the closing of the sigmoid valves; but on this I shall not dwell, as all controversy on this point has for a long time ceased. It was, I presume, to discover the cause of the first sound that the experiment was instituted.

The sound produced by the forcing of air into the ventricle, was certainly a lengthened one, but had nothing of that character about it that would mark it as the production solely of the shutting of the mitral valve; in fact, as I afterwards ascertained, regurgitation always took place into the auricle, and it was to the air rushing over the edges of its membranous curtains that my sound was no doubt in part due; and also, I may add, to a third cause, and which was the rush of air into the aorta. I by no means wish to assert that these causes operated in Mr. Brakyn's case, or that the sound he produced was not exclusively the result of the tension of the mitral valve, but I only wish to state, that having endeavoured to prove this myself, I have twice failed, and in all probability should do so again, for it seemed a matter of the utmost difficulty to drive a current of air into the ventricle with sufficient force, and in the proper direction, so as to close the valves suddenly and perfectly, seeing how they are fixed to the columnæ carneæ, which, in a post-mortem state, are rigid, and not readily admitting of extension. By opening the auricle to observe the valves, I found they never once perfectly closed, and even when placed nearly in apposition, they would not approximate when the current was directed upon them, without some air passing between and causing their vibration.

As regards the operation of the other cause, my experiments showed that when the mitral was shut, the projection of air into the aorta was also productive of a sound, and other observations have proved the fact that a noise is always caused by the injection of air or liquid into a tube. It should be remembered that by laying the valve open probably the aorta was quite occluded. That our attention should be turned to the flow of blood into the aorta as a probable partial cause of the first sound is shown by the interesting case of the child with its heart developed externally, which came under the notice of M. Cruveilhier, and in which instance he invariably heard the first sound loudest at the origin of the aorta, as though proceeding from, and having its rise at that spot. Because the second sound is undoubtedly caused by valvular tension, that therefore the first is so caused also is not a logical

sequitur, seeing how the mitral is fixed by muscular bands and surrounded by dense muscular walls, and not free to vibrate as are the sigmoids contained in a hollow tube with elastic walls. As a question merely of sound, for the reason that one might anticipate the sharp second as the result of valvular tension, so would the first appear more in accordance with that produced by a rush of blood than by the closing of a valve. Although I should place Mr. Brakyn's experiment before my own, on account of his many observations, and believe that the tension of the mitral valve did produce a large part of the sound, yet the difficulty of excluding the operation of other causes in my own case would make me rather incredulous whether they might not have some weight even in his, particularly as other observers would show a part of the causes residing elsewhere.

It will be seen I have referred merely to the practical part of the experiment, but there still remains a question of after-reasoning, and which is —What is the value of the experiment? Supposing the sound produced by Mr. Brakyn to have been wholly caused by the tension of the mitral valve, it does not follow that it is the same as the ordinary sound during life, for it is very possible that the sound produced in air, although resembling to the ear the natural one, is really not the effect of exactly the same cause, but equivalent to a valve acting in fluid plus the sounds arising from one or two other sources.

For all these reasons, and particularly the last, I cannot look upon the experiment as conclusive; besides, as I should have before mentioned, other experimenters have shown the sounds to be produced in a living heart when the valve was prevented from acting.

I may remark, in conclusion, that the second sound was certainly well illustrated by this clever experiment, and also many varieties of bruits might be produced by violently forcing the air back through the valves, so as to cause them to vibrate with different degrees of force.—*Lancet, Jan.* 19, 1850, *p.* 98.

38.—*On the Cause of the Sounds of the Heart.* By Dr. O'Bryen Bellingham, Physician to St. Vincent's Hospital, Dublin.—*Theory of the sounds of the heart most generally received.*—The theory of the mechanism by which the sounds of the heart are produced, which is most generally received is as follows :—

First sound.—The first sound of the heart is regarded as a compound sound, partly valvular and partly muscular, the valvular portion being its first and loudest part, and being due to the sudden tension or closure of the mitral and tricuspid valves. The muscular portion of the sound, which is dull and prolonged, is supposed to be caused by the contraction of the muscular fibres of the walls of the ventricles, and to be due essentially, according to Dr. Hope, to "muscular extension," but receiving a "prolongation, and possibly an augmentation, from bruit musculaire;" according to others, to bruit musculaire alone, or to friction between the fibres of the muscular tissue of the ventricles.

That this sound is partly due to the sudden closure of the mitral and

tricuspid valves, is considered to be proved "by the sound being loudest over the parts of the ventricles nearest to the auricular valves;" 2dly, "when valvular extension was prevented by holding the mitral valve open (in experiments upon animals), this greatly diminished the first sound;" 3dly, "whenever the auricular valves were destroyed, or the blood evacuated out of the ventricles, the sound became dull and obscure;" and lastly, by the character of the first sound in dilatation with attenuation of the ventricles, when it closely resembles the second sound.

That the first sound of the heart has its cause, likewise, in contraction of the muscular fibres of the walls of the ventricles, is considered to be be proved by the "character of the sound,"—by its continuing during the entire systole—by its being still heard, although weaker, in the heart of animals removed from the body,—"by its being heard, although modified, in animals, when the auriculo-ventricular valves were prevented from acting, or when the blood was prevented from entering the cavity of the ventricles by pressing upon the orifices,"—"by the sound being louder over the surface of the ventricles than over the origin of the large arteries,—and finally, by the sound being loud and short, when the walls of the ventricles are thin; and dull and prolonged when its walls are thick;" because a thick ventricle, cæteris paribus, takes a longer time to contract than a thin one.

Second sound.—The second sound of the heart is supposed to be due either to the sudden closure of the valves at the orifices of the aorta and pulmonary artery, owing to the recoil of the blood upon them at the moment the ventricular systole ceases; or to the shock of the column of blood in the aorta and pulmonary artery, which recoils upon these valves at the moment of the ventricular diastole. This theory is supposed to be proved "by the second sound of the heart being loudest over the sigmoid and semilunar valves, and a little above them"—"by the sound ceasing in experiments made upon animals, when the reflux of the blood upon the semilunar valves was prevented by compressing the arterial orifices with the fingers"—and "by its being diminished when a semilunar valve in one artery was hooked up, and replaced by a murmur from regurgitation when the same was done in both arteries."

Remarks on the foregoing theory.—The foregoing theory, it will be observed, omits from the elements capable of producing the sounds of the heart, all consideration of friction between the blood and the parietes of the orifices of the heart, in its passage into and out of the ventricles, during their systole and diastole. Yet when we come to describe the abnormal sounds heard in diseased states of the valves and orifices of the organ, we shall find that this very element, which is rejected as incapable of producing the normal sounds, is set down as the one which almost exclusively gives rise to the abnormal sounds of the heart. Now when we consider the force and rapidity with which the blood is propelled by the ventricles, particularly by the left, there can be no doubt that there is a considerable degree of friction between the blood and the parietes of the orifices through which it passes; and that this can scarcely happen without producing sound, appears evident, because even a slight

impediment to the current of blood is sufficient to convert the normal first sound of the heart into a murmur.

Thus in experiments made upon large animals, when the calibre of the aorta near its origin was narrowed by pressing upon it during the ventricular systole, the first sound of the heart was converted into a murmur. Again, if the stethoscope is applied over a large artery, a short, slight, single sound is heard at each systole of the left ventricle; but, if pressure is made upon the vessel so as to diminish its calibre, a murmur will take the place of the normal sound. Again, the blood in its passage through the veins causes no sound appreciable to the ear: under certain circumstances, however, sound is developed in particular veins, when their coats are made tense, and when their calibre is diminished by pressure with the stethoscope. This sound is familiar to us as the venous murmur.

Now, in each of these instances, there is an obstacle or impediment to the passage of the blood, and the increased friction, which necessarily ensues, is sufficient to convert the normal sound into a murmur. It seems probable, therefore, that abnormal sounds are nothing more than exaggerated normal sounds, exaggerated because the friction between the blood and the parts through, or along which it passes, is increased; and if we admit, as the foregoing instances seem to prove, that normal sounds can be converted into abnormal sounds, simply by increase of friction, it seems not unreasonable to conclude that both are developed by the same agency.

In addition, we know, that, in aneurism springing from the arch of the aorta, a double sound is constantly audible, and this double sound remarkably resembles the double sound of the heart; so close indeed is the resemblance, that the second sound of aneurism in this situation is erroneously supposed by many to be the second sound of the heart transmitted to the aneurismal sac. We also know that the first, or the second, or both the aneurismal sounds, are not unfrequently converted into murmurs, which have precisely the character of the murmurs heard in cases of valvular disease of the heart.

Now, in aneurism, in this situation, we have simply a sac communicating with a large artery by a single orifice, which is constantly patent: the sac is traversed by the blood propelled at each systole of the left ventricle, and into it the blood regurgitates at each diastole of the ventricle; yet every variety of normal and abnormal sound developed in the heart, with its muscular walls and valvular apparatus, may be produced also in an aneurismal sac which has neither the one or the other. It is scarcely, therefore, unreasonable to conclude, that the agent which is capable of generating sound in the one case is capable of developing analogous sounds in the other; and that, as sounds almost precisely similar to those of the heart, in its healthy as well as in its morbid state, can be produced independent of valvular extension, or muscular contraction, the latter are not such essential agents in the production of the heart's normal sounds as is generally supposed.

[Dr. Bellingham, then, attributes both the heart's sounds to friction between the blood and the parietes of the orifices through which it passes. He thus explains them:]

First Sound.—The first sound of the heart we know is synchronous with the ventricular systole: in this act, the blood, compressed by the contraction of the powerful muscular walls of the ventricles, is propelled with considerable force into the aorta and pulmonary artery, the sigmoid and semilunar valves of which are suddenly elevated. In the rapid passage of the blood from a wider to a narrower area, there must be considerable friction between this fluid and the parietes of the arterial orifices; quite sufficient, in my mind, to produce the prolonged first sound of the heart. This sound necessarily has a distinct character from the second sound of the heart, because the resistance to be overcome is so much greater, and the passage of the blood through these orifices is more gradual; it is likewise more prolonged, because sound must be developed during the entire period that the blood is passing from the ventricles into the large arteries: and the slower the action of the heart, the more prolonged will this sound be.

Second sound.—The second sound of the heart we know is synchronous with the ventricular diastole: during this act the muscular fibres of the ventricles are relaxed, the cavity of the ventricles enlarges, and the walls of the ventricles re-expand; the curtains of the auriculo-ventricular valves open, and there is a sudden influx of blood from the auricles through the auriculo-ventricular orifices. It is scarcely necessary to say that it is not the contraction of the auricles which propels the blood into the ventricles at this period of the heart's action; nor is the dilatation of the cavities of the ventricles the result of the entrance of the blood from the auricles, as some have supposed. It is not, either, necessary for the production of this sound that the diastole of the ventricles should be an active process like the systole; the ventricles being hollow muscles, the state of relaxation of their muscular fibres is a state of dilatation of their cavities: hence a vacuum would be created in them if the auricles were not at this period full of blood ready to supply them; but, as the latter had been filling during the whole period of the ventricular systole, this cannot happen, and the blood passes through the auriculo-ventricular orifices in a full and rapid stream, and with sufficient force to generate sound.

That the blood enters the ventricles with considerable force, would appear from what has been observed in experiments upon animals, as well as in the human subject. Cruveilhier says that, in a case of ectopia of the heart in an infant, when the organ was grasped with the hand during the ventricular diastole, it was violently and forcibly opened,—so much so, that he was at first under the impression that the diastole was the active state of the ventricles.

The second sound of the heart is much shorter than the first sound, because the relaxation of the muscular fibres of the ventricles in the diastole is rapid, and the motion is sudden and instantaneous. It has a different character from the first sound, because the blood has no impediment to overcome in entering the ventricles from the auricles. *Med. Gazette, March 29, and April 12, 1850, pp. 532 and 617.*

39.—*On the Rapidity of the Circulation of the Blood.* By Dr. Bellingham.—The rapidity with which the blood passes through the system can be estimated if the amount which is transmitted into the aorta at each systole of the left ventricle is known, and if the entire quantity of blood contained in the vessels is determined—the number of pulsations of the heart being given. Thus it has been estimated that the whole amount of blood contained in the vessels is about twenty-eight pounds; and that an ounce and a half is expelled at each systole of the left ventricle. If, then, the heart of the adult beats seventy-five times in a minute, 112½ ounces, or a little more than seven pounds of blood, would pass through the ventricle in a minute: in four minutes the entire twenty-eight pounds would pass through the heart; and in every hour it would pass through it fifteen times.—*Med. Gaz.*, *Mar.* 1, 1850, *p.* 359.

40.—SUMMARY OF THE PHYSICAL SIGNS OF VALVULAR LESIONS OF THE HEART.

By Dr. E. A. Parkes, Physician to University College Hospital.

[The following summary of the physical diagnosis of valvular diseases, is from a clinical lecture by Dr. Parkes.]

I. *Mitral insufficiency,* presenting all its characters in perfection, gives us—

1. A systolic murmur, having its maximum over the left apex, or just outside this, and being followed generally by a second sound.

2. An accentuation of the pulmonary second sound — the aortic second sound weakened. The accentuation of the pulmonary second sound may not occur if there be coincident *tricuspid* insufficiency. The weakening of the aortic second sound is said to be most marked in old cases in which the size of the aorta is often notably diminished.

3. The signs of dilated hypertrophy of the left side—sometimes those of the right side.

4. The signs of pulmonary congestion from reflux.

5. Thrill at the apex.

6. A feeble, small, and unequal, but not necessarily an irregular pulse. The smallness of the pulse often contrasts with the vigour of the heart's impulse.

Such a disease, when uncomplicated, is not attended by dropsical symptoms, or by any signs derived from the general venous system.

(*a*) Of these physical signs, the two last may be eliminated without weakening the certainty of the diagnosis; nor, without at least two others, are they of the least diagnostic value for this special lesion.

(*b*) If there be no evidence of pulmonary engorgement, that is, cough, hæmoptysis, (not dependent on its other known causes,) expectoration, &c., nor of dilated hypertrophy, the diagnosis of mitral insufficiency still remains sound, if, with a systolic murmur at the left apex, the pulmonary second sound be more accentuated, than can be considered normal, even in those who present naturally a sharp pulmonary second sound.

(*c*) If the only sign be a systolic murmur at the left apex, this proves, in all probability, disease and alteration of the mitral valve, but perhaps

not necessarily regurgitation. This statement is opposed to the usual rule laid down by writers, and especially to the opinions of Hamernjk, and is not to be considered a certain one. In fact, I have not scrupled, and shall not scruple, to speak of systolic murmur at the left apex as diagnostic of mitral insufficiency. But there are some cases on record, and in this Hospital we have lately seen two, in which thickening and vegetations on a competent valve, apparently produced the systolic murmur.

(*d*) Occasionally, but rarely, mitral regurgitation is unattended by any murmur, and must then be diagnosed by its other signs, if present. If not present, the disease is latent.

II. *Mitral contraction* is diagnosed with much greater difficulty. The following are the signs sometimes noted:—

1. A diastolic murmur at the left apex.
2. Pulmonary congestion and hæmoptysis.
3. Second sound in pulmonary artery sharpened (unless there is also *tricuspid* insufficiency) in the aorta enfeebled.
4. Frequently consecutive enlargement of the right heart.
5. If there be no absolute diastolic murmur at the apex, there may be several sounds, two or three, following the systolic sound. Sometimes these may be reduplications only of the normal second sound, but often they proceed apparently from the mitral valve itself, and are, perhaps, attributable to cleavage of the first sound or such moiety of the first sound may be heard with a second sound.
6. There is sometimes purring tremor at the apex. Dr. Hope thought it never occurred, but it has been recorded.
7. The pulse, as in mitral regurgitant, is weak, unequal, and, from accompanying general dilatation of the heart, may be irregular.

A co-existent systolic murmur is very common, from accompanying mitral insufficiency. Frequently the diastolic sound is wanting; perhaps from the nature of the contraction, perhaps from the feebleness of the current of blood. The pulmonary symptoms which are present, may appear referrible to a co-existent mitral regurgitant disease, and it then becomes almost impossible to diagnose mitral contraction. In such a case, the flow of blood through the aorta, as judged of by the character of the aortic second sound, and the state of the pulse, may be more impeded than can easily be accounted for by the existent mitral regurgitation. Then we may suspect, and carefully examine again for, mitral contraction.

III. *Tricuspid insufficiency* may give the following signs: 1. A systolic murmur at the right apex; 2. Pulsation and refilling from below of the external jugulars; 3. Signs of hypertrophy, and dilatation of the ventricle, and often of the auricle; 4. Second sound at the right apex often lost; the cause of the deviation from the common rule in mitral insufficiency is obscure. It may depend on a lessened column of blood in the pulmonary artery.

The almost inevitable consequences of any amount of tricuspid regurgitation are impediment to the general circulation and anasarca. The systolic murmur is not always present; nor are the jugular pulsations; but if there is decided evidence of dilated hypertrophy of the right heart,

and general anasarca, which cannot be referred to another cause, then the diagnosis may be made of tricuspid disease, either regurgitant, as it almost always is, or obstructive, as it is in some very rare instances. If, in such a case as dropsy, there are no signs even of dilated hypertrophy, then the general venous congestion may be owing to an exceedingly weak and dilated heart. Often the diagnosis of tricuspid insufficiency must be drawn altogether from the general symptoms.

IV. *Tricuspid contraction* is so rare a disease, that its signs are not yet known. A diastolic murmur at the right apex from this cause has not, to my knowledge, been recorded. Possibly we might suspect such a lesion, if, to the signs of general dropsy, there were joined evident dilatation of the right auricle without the signs of ventricular hypertrophy, and without the murmur of tricuspid insufficiency.

V. *Obstructive Aortic disease.*—1. A murmur at the base, with its maximum over the valves, or just above, and carried along the aorta. If the contracted orifice be very smooth, the murmur may be wanting. 2. Hypertrophy of the left ventricle, in a degree determined by the extent of the contraction and the general health and occupations of the individual. 3. Aortic second sound very weak, even wanting, but not superseded by murmur. 4. Occasional purring tremor. 5. Pulse unaffected, till contraction be extreme, then small and rather hard, not soft and unequal.

Very nearly the same signs may be given by roughness of the lining membrane of the aorta, by dilatation or aneurism, by pressure from a tumour, or even from a tuberculous lung; only in such cases, if the valves are healthy, three circumstances will often fix the diagnosis: 1. That the sound is at its maximum above the valves, and is hardly at all heard below them. 2. That the aortic second sound is of good tone. 3. That the morbid sound is carried a long way down the aorta, and can often be heard better in the back than over the heart. Hamernjk, of Prague, doubts whether a murmur will arise from a roughened aorta, but this cause is usually admitted in this country, and I believe properly so.

Systolic murmurs may arise at the aortic orifice and in the aorta in some cases in which there is no reason to suspect organic change, viz., in anæmia, in typhoid, and probably in typhus fever, in puerperal fever, and it is said in the exanthemata. So also in cases of pressure from below, as in abdominal tumours and pregnancy, or from the side, as in some cases of tumour not directly pressing on the aorta, inorganic murmurs will occur. It is not always easy to diagnose these from aortic disease, except in the case of anæmia. An inorganic murmur thus arising, is called by Hamernjk "diffuser ton," but the murmur is often as perfect as any arising from obstruction. It is said, that in rheumatism a murmur will occur at the aortic orifice, without endocarditis.

VI. *The signs of aortic insufficiency* were given at the last lecture. I need only mention one more of little importance, viz., a lengthening of the interval between the heart's impulse, and the beat at the wrist. Neither of these diseases of the aortic mouth are necessarily attended by obstruction to the general circulation.

VII. *Obstruction and regurgitation at the pulmonary* orifice are very

rare. The signs of such states will be analogous to similar conditions of the aortic orifice.

Such being the general summary of the physical signs, the following provisos should be borne in mind in examining cardiac affections.

1. These rules pre-suppose that the heart is in its natural position, has an unchanged axis, and is not to an abnormal extent covered or uncovered by lung; in fact, that there are no circumstances present which may falsify, so to speak, the elements of the problem. If such changes are present, it must be seen what amount of uncertainty they cause in the diagnosis.

2. In the matter of murmurs more especially, it should be always remembered, that to cause vibrations of valves and murmurs, a strong current of blood is necessary. If, therefore, with an extremely feeble heart, there are no murmurs, we cannot say that there is no affection of the valves with the same certainty, as if with a strong powerful heart, and a good current of blood, there was an equal absence of murmur. In this last case we might be all but certain there was no valvular disease, but not so in the former case. Therefore, with an extremely feeble heart, the diagnosis must be qualified. You will find it stated by a writer of authority on diseases of the heart, Dr. Blakiston, that mitral regurgitation is "sometimes, but not often," accompanied by systolic murmur at the apex. I must confess, that as far as I have myself been able to examine cases, and to consider those recorded by others, I should doubt whether this statement is not too broadly put. It appears to me, that except in cases of manifestly weak hearts, or failure of circulation from arrest of the current of blood, if the other signs of mitral regurgitation exist, the systolic murmur at the apex is never or very seldom wanting. Among the great number of instances of systolic murmur at the apex which daily present themselves, the difficulty, it appears to me, is to decide whether the murmur is to be referred to regurgitation, or to other conditions of the mitral valve, not involving insufficiency. But there is seldom any difficulty in finding the murmur in decided insufficiency.

3. When two or more cardiac diseases are combined, the signs may be slightly modified; thus, extreme mitral regurgitation, with a rather weak heart, may prevent an aortic obstructive or regurgitant murmur, by greatly diminishing the flow of blood through the orifice. Such a condition, however, does in reality fall under the rule given above. Again, tricuspid insufficiency may prevent any increased sharpness of the pulmonary second sound in mitral insufficiency.—*Med. Times, Feb.* 23, 1850, *p.* 131.

41.—*Conclusions respecting Valvular Diseases of the Heart.* By Dr. A. W. Barclay, Physician to the Chelsea, Belgrave, and Brompton Dispensary. [Dr. Barclay makes the following deductions from the analysis of a large number of cases occurring at St. George's Hospital:]

1. Liability to double valvular disease is a consequence of rheumatic endocarditis; and this disease may attack at an early period of life, and terminate fatally at an early period.

2. A decided limit appears to be set by age to fibrinous deposit on the valves of the heart.

3. Atheromatous disease affects not by preference the mitral valve, as has been sometimes stated.

4. Though endocarditis is most commonly an acute disease, originating in connection with acute rheumatism, yet it appears that the endocardium or lining membrane of the heart is liable to become the seat either of chronic inflammation and its effects, namely, thickening and induration with corrugation of the valves, and arctation of their apertures, or of atheromatous deposition.

5. After this condition of the endocardium and valves has been insensibly established, an acute form of the disease may supervene, or hypertrophy or dilatation may ensue.

6. A large proportion, that is, nearly one-half of the fatal cases of granular kidney, is found coincident with valvular disease; but valvular disease is rare in those cases in which the kidney is large and mottled.

7. As a corollary from deduction 6, it must be admitted as probable, if not certain, that the large mottled kidney is a different disease from the granular or hard, and usually small kidney.

Points requiring farther investigation are the following :—

1. Whether the double valvular affection be the immediate, or the remote consequence of rheumatic endocarditis; and from what circumstance the disposition to renewed attack of the disease is derived ?

2. Whether endocarditis ever proceeds from the enlarged and mottled state of the kidney as its sole cause; and why, among so great a number of cases connected with granular kidney, the inflammatory action was not more frequently found recent?—*Edin. Med. and Surg. Journal, April* 1850, *p.* 344.

42.—*On Complications occurring in the train of Chronic Cardiac Disease.* By Dr. A. H. Douglas, Physician to the Edinburgh Infirmary.—There is great variety in the manner in which pulmonary complication is associated with disease of the heart; its influence, however, is, under all circumstances, most formidable, and it demands direct and active treatment. It is not always possible to determine whether the pulmonary lesion originated the existing attack, or whether it arose *late*, and as a sequence of the disordered circulation: but this does not involve any practical difficulty. The complication never exists in a simple form; hence the uncertainty of its indications during life. Bronchitis is rarely wanting, and it has an admitted relation to the disease of the heart as an effect; pleurisy and pneumonia usually co-exist, and the signs of the former more or less mask those of the latter. It is in such cases that blistering is serviceable—subduing pleurisy as well as bronchitis. The chronic affections of the heart itself are not benefited by counter-irritation: but relief of the respiratory function impeded from pulmonic complication, by counter-irritation or otherwise, goes far to diminish obstruction of the circulation.

Decided jaundice does not arise frequently in the progress of diseases of the heart; and, considering the direct influence of the obstructed circulation on the liver in all the forms of disease of the heart, this is remarkable. I do not remember to have met with it, except in two cases; in both of these cases it occurred shortly before death, and no treatment had any effect upon it.

In former cases it has been shown, that the condition of the right ventricle exerted a powerful influence on the state of the circulation; and it has been argued that a patent state of the right auriculo-ventricular communication is a chief cause of the obstructed state of the circulation, which I have been led to connect rather with general dilatation, possibly of *one*, probably of *both*, ventricles. It has been almost established, that a degree of incompetence of the tricuspid valve is not inconsistent with health; and I believe that the higher degrees of widening of this aperture arise only in connection with dilatation of the right ventricle: and, moreover, there ordinarily co-exists more or less dilatation of the left ventricle. It is impossible to attribute the obstruction of the circulation to one of these lesions to the exclusion of the others; but, if one has a primary importance, I believe it is the dilatation of the ventricles.

Valvular disease of the right side of the heart is admittedly rare.

The physical signs of valvular incompetence require little notice—they are for the most part well understood, though the value of some has been over-estimated. Confusion has arisen from importance being attached to the character or tone of the endocardial murmurs: their true diagnostic value depends upon two circumstances—the *position* in which they are most distinctly audible, and their relation to the *rhythm* of the heart's action. It matters not whether endocardial murmur be musical, grating, or soft and blowing, with the exception already indicated in contraction of the mitral orifice, in which the characteristic murmur appears to have a *harsh grating* character. In illustration of this point, I shall only refer to two cases which have been brought under my notice; in both, incompetence of the aortic valves was attended by a murmur so loud and shrill that it was audible at a distance of several inches from the surface. But the nature or seat of the disease in these cases was determined solely by the *position* and *rhythm* of the murmur, which existed, as in all such cases, at the *base* of the heart, with the *second sound*. The musical character or loudness of the murmur was connected with the intensity of the vibration, caused by the regurgitant current, which was accompanied in both cases by a vibrating *fremitus*—a sign not usually observed in aortic incompetence.

The various changes which the pulse undergoes are more intimately related to changes of the muscular substance, than to valvular lesions. There are conditions of the pulse which depend only upon valvular disease; but these may be limited to two—the small pulse of mitral or aortic contraction, and the quick diastolic pulse of aortic regurgitation.

The *visible* pulse is not always an abnormal condition; but, even in its higher degrees, it has no relation to valvular disease. *Irregularity* has been regarded as significant of mitral incompetence: but it frequently exists in cases where there is no valvular disease; and it occurs with

mitral incompetence, in such circumstances, as lead me to believe that it arises only in consequence of superadded dilatation.

Want of *synchronism* of the arterial pulse with the heart-beat has a doubtful connection with valvular disease; it does not occur, except in conjunction with more or less dilatation; and I have met with it altogether apart from valvular disease.

Delay of the radial pulse has been stated to depend upon incompetence of the aortic valves: I do not think such is the fact. The radial pulse is naturally more or less posterior to the heart's impulse; and the interval may vary within the limits of health; besides, from the very nature of the thing, it is difficult or impossible to affirm in a particular case that the *degree* of delay is abnormal. From my own observations, I am satisfied that an appreciable increase in the delay of the arterial pulse is very rare; and it does not arise in such a proportion of cases of aortic incompetence as to indicate any relation between them.

Adhesion of the pericardium has been said to manifest itself by a peculiarity of the pulse, which certainly existed in one case; the impulse communicated to the epigastrium, with an undulating and "jogging" movement. This state of the impulse accompanies diseases of the heart in which no pericardial adhesion exists; for how frequently do we find that adherent pericardium only reveals itself post-mortem. My own opinion is, that the manifestations of heart disease will arise, in connection with adherent pericardium, only after hypertrophy or dilatation have been superadded.—*Monthly Journal, May*, 1850, *p.* 450.

43.—ON THE PROGNOSIS OF ORGANIC DISEASES OF THE HEART.

By Dr. C. J. B. Williams, F.R.S.

[Dr. Williams remarks that though the *diagnosis* of organic diseases of the heart has now become comparatively easy and accurate, yet our knowledge of the *prognosis* and *treatment* of these affections is not by any means in such a satisfactory state. In directing our attention to the subject of prognosis, Dr. Williams shows that the character of the signs is no measure of the severity or danger of diseases of the heart, but that the prognosis is really to be decided by a consideration of other circumstances, which he classifies under two heads:]

1. A Structural disease of the heart may be considered serious and dangerous, in proportion as it impairs the power of the organ to carry on the circulation. We may judge of this power both by the physical signs of the action of the heart itself, and by the condition of the circulation at large. The power of the heart to carry on the circulation is represented by its natural sounds; and so long as they are distinct, with their proper characters, of comparative dulness or prolongation of the first or systolic, and clearness or shortness of the second or diastolic,—then, no matter how loud the accompanying murmurs, the heart is doing its work, and there is little ground of present alarm. If, on

the contrary, the natural sounds are indistinct, or considerably altered, being too faint to be audible in the usual position, or superseded (not merely masked) by abnormal murmurs,—then, whether there be loud murmurs or not, whether there be palpitation or irregular action or not, whether the impulse be strong or weak, it may be inferred that the heart's action is seriously impaired; and the lesion must be considered of a dangerous kind.

I have notes of more than a score cases, such as the following:—A physician of eminence was consulted on account of a young lady, who had a slight pain in the chest, with moderate palpitation. On applying his ear to the chest, he heard so loud and harsh a cardiac murmur, that he was alarmed, and recommended that I should see her. On examination, I found a very loud, grating systolic murmur, having its greatest intensity to the left of the sternum, between the second and third ribs, where there was a palpable thrill. According to Dr. Hope's rules of diagnosis, this must have been situated in the pulmonary artery; but finding the murmur distinct also in the carotids, I considered it to be in the aortic orifice; this opinion was confirmed by a perceptible thrill in the pulse. But is more to the present purpose, that this murmur, loud as it was, did not supersede the natural double sound; and the impulse, although stronger and more heaving than natural, was not far beyond its proper position. I judged therefore, that there was no present danger; and the regularity and moderate frequency of the pulse, as well as the absence of other serious symptoms, pointed to the same conclusion. This lady had some years previously suffered from some inflammation in the chest, and had ever since felt more or less palpitation on over-exertion. Such an exertion was the cause of her present ailment, which, to her own feelings, subsided after some days' rest and the use of very simple remedies; yet the murmur remained nearly as loud as ever. After being directed to pursue the rational plan of caution against all circumstances likely to derange the circulation or general health, this lady returned to the country quite well, and pursued her usual occupations and amusements. This was six years ago; I have seen her three or four times since, enjoying her usual health; but the murmur remained nearly as loud as ever. In this case, I consider there was a small body projecting into the aortic orifice, and that, although causing noisy vibrations in the current, it did not oppose the passage of the blood sufficiently to disorder the proper action of the heart and its valves. Hence these, in their usual transition from slack to tight, in systole and diastole, still produced their natural sounds; which were thus a proof of the sufficient integrity of the heart in its functions.*

The following case of regurgitant aortic disease bears on the same point. A man, aged about thirty, who had formerly suffered from acute rheumatism, was admitted into the hospital for a slight ailment, attended

* This is my explanation of the natural sounds, inferred from the experiments before referred to. The ventricles, with their valves, at each systole, are suddenly tightened on the contained blood, and thus produce the first sound, which is more or less prolonged till the vibrating, and therefore sonorous tension, ends in the diastole; then the ventricles are relaxed, but the parts suddenly tightened now are the arterial valves, which simultaneously closing under the recoiling column of blood, give the second or diastolic sound.

with palpitation. The remarkable feature of his case was, a very loud musical murmur, of a cooing tone, following the second sound. Although most intense at and near the midsternum, it was distinct in every part of the chest; it could be heard not only in the arteries of the neck, but faintly even in the radial artery of the wrist. This patient was quite a stethoscopic curiosity, and was kept in the hospital on that account, rather than because he required special treatment. Accordingly, the natural sounds of the heart were quite distinct,—proving a fair performance of the natural function; although the systole, in its duller sound and extended and lifting impulse, implied some degree of hypertrophy of the left ventricle. As far as regarded the heart disease, therefore, in spite of the loudness of the morbid sound, the prognosis was not unfavourable; and we learned from his history, that for several years the noise in his chest had been noticed, when his health had not materially suffered. It happened, however, unfortunately, that he took a prevailing typhus fever, and died in the hospital. On examination of the body, the ventricles were found moderately enlarged and thickened, and the valves all healthy, except the aortic, one of which had the free margin neatly retroverted, so as to leave a fine, smooth chink for regurgitation. Some of those present at the examination, expressed themselves disappointed at finding so little lesion to account for so remarkable a sound; but, considered acoustically, it was precisely calculated to explain the sign, by affording a narrow slit for a uniform refluent jet, producing the rapid, equal, and prolonged vibrations, which constitute a musical tone.

Instances of noisy mitral regurgitation, without dangerous heart disease, are still more common. I have a great many patients on my books, whom I have occasionally seen for several years past, who have the systolic murmur below the left breast, which, in 1835, I proved to be characteristic of mitral regurgitation; and which, provided it merely accompany, and do not greatly supersede the natural double sound of the heart, is by no means so formidable a sign as is generally supposed. In some of these cases, the patients complain less of their heart than of their breath, or their digestion, &c.; in others, nervous palpitation or pain is a troublesome symptom, and aggravates the sufferings and fears of the invalid: but none of these symptoms are adequately proportioned to the cardiac lesion; and they may come and go, whilst this is constant. But so long as the natural sounds of the heart are distinct, and the impulse does not spread far beyond its natural limits, although the murmur be loud and the symptoms distressing, we need not despair of amendment and restoration to moderate health.

In all cases, however, in which the existence of a valvular lesion is proved by the persistence of a murmur, the prognosis must take into account not only the present amount of the lesion, but what it is likely to become; whether it be stationary or progressive; and whether, although now it do not seriously affect the ordinary work of the heart, as evidenced in its motions and sounds, it may not be so increasing, as to tend to interfere with them, and thus to develope dangerous disorder. To determine this point, we have to consider the recent history of the case, and watch its progress for some time. Thus, if symptoms of disordered action of the heart have manifested themselves only recently, in consequence of an

accident, a sudden mental shock, or an inflammatory attack in the chest, then it is possible that the disease, although moderate now, may be on the increase; and even in a case of slight lesion, a favourable prognosis cannot be pronounced, until further observation shall prove that there is no tendency to increase. But if the history give no evidence of a sudden or recent affection of the heart, and if examination, repeated after the lapse of a week or so, discover no remarkable variation in the physical signs, it may be inferred, that the lesion is stationary, and may be considered less formidable in proportion as the natural sounds remain unaffected.

With the cases above described, as presenting through their physical signs a favourable prognosis, may be contrasted those of an opposite description, equally declaring themselves by their physical characters. We have seen that it is not the loudness nor harshness of the morbid murmurs, that proves the formidable nature of a cardiac disease; but rather the degree and mode in which natural sounds are superseded, or changed from that type in which they represent a healthy working organ. Thus when, instead of the natural first sound and impulse, there is only a soft blowing or musical murmur, with little or no impulse, or when a murmur of any character supersedes completely the natural second sound,—we have, at once, the proof of a serious and dangerous alteration of structure: and this is commonly, but not constantly, evinced by faintness, distressing palpitation, or irregular action, with other symptoms of failing function in the centre of the circulation. The most formidable cases of this description, are those in which the valves of an orifice have been broken down, either by some violent exertion, or by a sudden increase of endocarditis or degenerative softening. I have met with several examples of this kind. There had been the signs of a moderate lesion previously,—a murmur accompanying one or both natural sounds; when, after a violent strain, or excessive mental excitement, sometimes with the sensation of something suddenly giving way, the action of the heart becomes tumultuous and irregular, with more or less faintness or oppression; and the sounds of the heart are found to have become changed, the natural sounds being indistinct, the rhythm irregular, and the murmur altered in character, but not always increased in intensity. In other instances, a similar change has occurred less suddenly, but still within a few days, by the rapid destruction resulting from acute endocarditis, or from fatty degeneration of the valves; in such cases, general symptoms of cachexia, and of serious disorder of the blood and excernent function are also present, to give warning of the impending danger; for destructive endocarditis, and degeneration of textures, do not occur in a healthy constitution. But the change in the sound of the heart is here all the more sure token of evil, and the sufferer seldom survives many days, or weeks at furthest.

When the lesion of the valves is slower in progress, and only gradually impairs the natural sounds, its fatal influence is often successfully counteracted, for a time, by the powers of nature. This they can do in slow cases, by developing increased strength and substance in the muscular walls of the heart. The more this is done by simple hypertrophy, without degeneration, or much dilatation, the better will it accomplish its

end,—the augmentation of the damaged power of the heart to propel the blood. It is thus that we sometimes find the most formidable kinds and degrees of organic disease of the heart *gradually* developed, without sacrificing life, and, occasionally, without altogether precluding a limited amount of health. We do, now and then, meet with examples of most frightful amounts of change of structure—the normal sounds superseded by all kinds of unnatural blowing, sawing, or grating noises—the impulse exaggerated into a wide, tumultuous heaving stroke, which, with its almost equally violent diastole, so shakes the walls of the chest, as to give a shock to the whole frame; yet the patients complain of little or no palpitation or discomfort, and have far less of suffering or fear, than most of those persons who are affected with merely functional disorder. By substituting increased force for completeness of mechanism, nature does manage to compensate for the defects for a while, and, under favourable circumstances, to maintain the circulation to a degree that is surprising, considering the amount of the lesion. But this compensatory power is very uncertain and unruly; it is very apt to exceed its due bounds, and further to damage the heart and adjoining vessels by its violence; or to falter and suddenly fail, when exhausted by an unusual effort: so that even these cases, the best of their class, hold life by a very uncertain tenure. The machine, working at a high pressure, to which it is not adapted, may suddenly stop from the expenditure of its power, or soon become worn out by the strain; and thus we are justified in applying a more or less unfavourable prognosis even to chronic cases, where the natural sounds of the heart are materially impaired.

In many cases, the compensatory efforts of nature are even less successful than in those last noticed; the hypertrophy of the walls is frustrated by dilatation, which implies the expenditure of the force on the cavities; or it is vitiated by fatty degeneration, which not only deprives the muscular fibres of their contractility, but renders them yielding and lacerable, and liable to functional failure or fatal rupture. Hence, a dilated flabby heart is the worst addition to valvular disease and may render formidable even that which is not in itself dangerous. In this case, the systolic sound may be distinct, and even loud, and heard over a wide extent; but it is short, and with the brief knocking impulse, expressive of the deficiency of contractile power. The rhythm is commonly irregular, and the pulse very weak and unequal.

2. The second group of circumstances that affect the prognosis of organic diseases of the heart, are those relating to the condition and general circulation of the blood.

The mechanism of the heart is adapted to certain degrees of spissitude and quantity of the blood, and the vital properties of the organ are sustained by its richness and purity. Any considerable deviations from the normal state of the blood, will disorder the action even of a healthy heart, much more that of one, the structure of which is imperfect. Thus, a thin watery state of blood will mechanically exaggerate the unnatural vibrations and regurgitations arising from valvular disease, and will increase the murmurs which these occasion; whilst the vital properties of the heart, being alternately irritated and exhausted by the irregular quantity and quality of its sustaining fluid, will be still further disor-

dered, and raise the functional disturbance to its greatest possible height. Hence there are no cases which are more distressing, or seem more alarming, than those of valvular disease combined with *anœmia;* and many such instances have I seen, reduced to this condition by the injudicious employment of an antiphlogistic or lowering treatment. But so long as the natural sounds and impulse of the heart are distinct, and there is no evidence of a worse complication than anæmia, although the murmurs may be very loud, the palpitation very violent, the occasional faintness distressing, and all manner of anginal pains and oppression be present, and even although anasarca may have begun to appear, yet these cases are by no means hopeless. In many instances, they improve so much under a soothing and sustaining treatment (including sedatives, chalybeate tonics, and nutritious diet), that the patients sometimes think themselves cured: but the valvular lesion is still detected by its murmur, although its diminished intensity shows that it is of minor importance, now that a better state of blood has restored to the heart its proper sustenance. It may be inferred, therefore, that simple anæmia, although often greatly aggravating the symptoms, and exaggerating the signs, of heart-disease, is not a dangerous complication, if it be seasonably and properly treated.

The same observation will apply to *general plethora,* or simple excess of blood. This too, by exalting the vital properties of the heart, and by putting its mechanism to a strain, increases the intensity of the symptoms of organic disease; and, if uncontrolled, tends to spread its destructive effects. Under such circumstances, the prognosis is unfavourable only when the proper antiphlogistic and sedative treatment cannot be practised, or has been neglected too long: when these are judiciously and seasonably employed, the amelioration of the symptoms, and the diminution of the morbid sounds and impulse, are often very remarkable.

But the most common of all the complications of heart-disease, and the most important to be considered in the prognosis and treatment, is that with *deteriorated quality* of blood. Cachexia and toxæmia, in all their varieties, uræmia, cholæmia, lithæmia, (lithic acid in the blood), oxalæmia, pyæmia, and others, which it would be hard to name, might be exemplified from clinical experience as constituting prominent elements in the history of cases of organic disease of the heart, and almost stamping them with the proper indications for their treatment. The subject is too wide to be discussed in full, it must suffice to take the more common examples of blood depraved by the retention of excrementitious matter in it.

Experienced practitioners have long been familiar with the fact, that in organic diseases of the heart, and, in fact, in most chronic maladies, it is of the first importance to attend to the state of the digestive organs, and to the secretions of the liver and kidneys. In truth, so prominent is this practical fact, and so manifestly does disorder of these several organs give occasion to the troublesome symptoms in the heart, that both practitioners and patients not uncommonly jump to the conclusion, that the true seat of the disorder is the stomach, or liver, or kidneys, and that the heart is only "sympathetically affected." The auscultator avoids this

mistake ; he is well assured, by the signs, that organic disease exists in the heart; but he will fall into an error of equal practical importance, if he neglect the consideration of those derangements of other viscera which react on the damaged heart, and render its imperfections more serious and distressing. The mode of their influence is, doubtless, in some cases, conveyed through the medium of nerves; and, therefore, may be called "sympathetic:" as where a bit of shell-fish or bitter almond in the stomach instantaneously causes palpitation or syncope, (this may happen without any organic disease, but it is more likely to happen with it). In other cases, the disturbing influence is merely mechanical; as where a stomach, inflated with gas, or distended with bulky crudities, presses on the heart; or where an enlarged liver has a similar effect. But most commonly, the medium which conveys the disturbing influence is the blood; loaded with morbid matters, resulting from bad digestion or imperfect excretion, it disorders the various organs through which it is distributed; and none more than the heart, whose injured structure makes it most susceptible of the disturbing influence; hence ensue attacks of palpitation or irregular action, and other symptoms of disturbance, which magnify a disease, before quiescent and scarcely observed, into a distressing and possibly dangerous malady.

Nor is the permanent affection of the heart unconcerned in producing the functional disorders which react thus severely upon it. These may be more or less owing to constitutional peculiarities, or accidental causes; but they are, in part, the result of the disturbed circulation connected with the cardial lesion. This always operates, in some degree, by inducing congestions or irregular flows of blood in the several parenchymatous organs. The lungs, the liver, the kidneys, and the mucous membranes, especially suffer from this disturbance; and, although insufficient to produce prominent symptoms, it sooner or later impairs or disorders their functions. Hence, we find the subject of organic disease of the heart occasionally, and in some instances almost periodically, suffering from biliary or stomach disorders; from asthmatic or catarrhal affections, or from some of those multiform rheumatic, gouty, and kindred ailments that are connected with imperfect elimination by the kidneys. Any additional circumstances, tending further to lower the regular force of the circulation, may prove co-operating causes; such as exposure to cold, undue exertion or fatigue, irregularities of diet, and the like. And under their superadded influence, the exacerbation of the heart disorder will take place sooner, and with greater severity.

The primary pathological condition in the affected viscera thus induced by a heart disease, is generally congestion. Often we have the physical signs of congestion in the lungs, or liver, and, I may add, sometimes in the kidneys. Their functions are then more or less impaired; and in no symptom have we better evidence of this, than in the state of the urine, which generally becomes scanty, high coloured, and occasionally turbid, and in severe cases, albuminous; less commonly, it is pale and watery. As this proceeds, the action of the heart is more deranged, until more or less of a paroxysm of inordinate or irregular action is developed, with the usual distress and increased disturbance of all the functions. Here we trace the influence of the defective excretion in

impairing the quality of the blood, and in developing and aggravating the imperfections of the organ which propels it. In the same cases conjointly, in others separately, the liver may likewise suffer, and in its increasing bulk and tenderness, it gives evidence of congestive enlargement; whilst, in many instances, a tinge of the conjunctiva, and even of the skin, porphuria, and various other signs of bilious derangement, afford proof of the presence of bile in the blood. Here the heart soon feels the deterioration of its proper stimulus; and faintness or irregular action, sometimes with a peculiar kind of breathlessness, is the consequence.—*London Journal, April* 1850, *p.* 311.

44.—*On the Use of Oil of Turpentine as a Styptic and Astringent.* By Dr. Thos. Smith, Cheltenham.—As an *astringent,* in doses varying from 20 minims to a drachm, according to the urgency of the symptoms, and repeated every three or four hours, turpentine is one of the most efficacious remedies which we possess. The best vehicle for its administration, in the first place, is water, flavoured with syrup of orange, or any other agreeable aromatic. It may afterwards be advantageously combined with any other therapeutic agents, which the special nature of the case may require: thus, in epistaxis depending upon rupture of one or more small vessels, and where much arterial blood has been lost, muriated tincture of iron will form a valuable adjunct. In hæmatemesis and other sanguineous discharges from the bowels, it may be united with compound infusion of roses, sulphate of magnesia, iced-water, and solutions of tannic or gallic acid. In some forms of hæmoptysis, it may usefully be added to infusions of matico; in hæmaturia, to the decoctions of uva ursi, chimaphila, pyrola, etc.; or to tincture of sesquichloride of iron, etc. In purpura hæmorrhagica, the decoctions or infusions of the barks form with it an excellent adjuvant. In hæmoptysis, it has speedily and effectually arrested the hemorrhage; and is a much safer remedy than lead.

In my experience, there is no single medicine in the materia medica, that can be compared with it as a *styptic,* either as to certainty of action, or to the safety of its effects. It is compatible alike with acids and alkalies.—*London Journal, April* 1850, *p.* 328.

DISEASES OF THE ORGANS OF RESPIRATION.

45.—ON THE NATURE AND CAUSES OF THE NATURAL RESPIRATORY MURMUR.

By Dr. Herbert Davies, Assistant Physician to the London Hospital.

[Dr. Davies very justly remarks that the study of the respiratory murmur forms the very basis of the science of auscultation. He therefore enters into the discussion of its nature and causes, at some length. He says:]

As the extent of the disease occurring in the pulmonary organs is, for

the most part, measured by the amount of deviation which the morbid murmur presents from the healthy respiratory standard, we must evidently familiarize ourselves, at the outset, with the character and limits of the normal pulmonary sounds, before attempting the consideration of the alterations which indicate the presence of disease. On placing a stethoscope over the larynx and trachea of an individual, we at once distinguish, during the act of respiration, a loud, dry, hoarse, hollow, rushing sound, evidently resulting from the passage of a current of air over a surface which presents a considerable degree of friction to its progress. This sound, which may be readily imitated by placing the middle of the dorsum of the tongue in apposition with the hard palate, and inspiring or expiring with considerable force, may be traced downwards to the point where the trachea passes into the cavity of the chest, when its tone becomes modified and ultimately changed into one of a totally dissimilar character.

The sound which is audible over the upper bone of the sternum, and very commonly, in thin persons, in the inter-scapular region, at a part corresponding to the root of the lungs, is termed the bronchial murmur, and is well imitated, as suggested by Barth and Roger, by blowing into a roll of paper, or across the orifice of a stethoscope; in its character it bears a close resemblance to the tracheal sound, and only differs from it in being softer in its quality and less loud in its intensity. Considerable importance is to be attached to the determination of the exact limits of the natural bronchial murmur, or tubular breathing, as it is sometimes called. Some diversity of opinion exists among authors upon the extent to which this sound may be heard. M. Fournet limits its seat to the inter-scapular region. Dr. Hughes states that it is sometimes absent in all the localities, (the upper part of the sternum, the inner side of the infra-clavicular and the inter-scapular regions); but sometimes, when inaudible on the front of the chest, it may still be heard close to the spine, at a level with the centre of the scapula. Dr. Williams extends it "over the space of from one to two inches on each side of the top of the sternum." My own experience, however, leads me to concur in the view adopted by Dr. Walshe—that while the sound in question is frequently distinguished in the inter-scapular space, its seat in front of the chest is limited to the upper part of the sternum; and that any increase in its extent, right or left of that position, is in general to be regarded as an indication of the presence of some morbid condition of the lung. It must not be supposed that because the bronchial murmur is inaudible in health, beyond the positions just specified, that no vibrations occur in the air contained in the further bronchial ramifications; on the contrary, we can have no doubt of the presence of these vibrations, and we account for their being inaudible, from two circumstances—

1. The bronchial ramifications being covered by a layer of lung, whose peculiar vesicular murmur masks the true bronchial sound; and

2. The lamina of lung, always containing more or less air, presents a non-homogeneous structure, which stifles, rather than conducts, the bronchial vibrations to the chest-walls.

The latter is perhaps the more effective cause of the two in rendering the vibrations inaudible.

We have an interesting example of the non-conducting nature of non-homogeneous bodies in the following simple experiment, first suggested by Chladni:—

If we fill a tall glass—a champagne glass, for instance—half full of that sparkling fluid, it cannot be made to ring by a stroke on its edge as long as the effervescence lasts and the wine is full of air-bubbles, but gives a dead, puffy, disagreeable sound. As the effervescence subsides the tone becomes clearer; and when the liquid is perfectly tranquil, the glass rings as usual; but on re-exciting the bubbles by agitation, the musical tone again disappears. To understand the reason of this, we must consider what passes in the communication of vibrations through the liquid from one side of the glass to the other; and it is clear that if any considerable part of a system be unsusceptible of regular vibration, the whole must be so. — (Herschel,—Art. "*Sound*," Encyclopædia Metropolitana.)

The third species of sound which is due to the current of air traversing the free passages of the lungs, is the pulmonary, or vesicular murmur —a sound which is soft and expanding in character, and is best imitated by gently pronouncing the letter *v* or *f* in a prolonged manner, the air which passes through the orifice between the compressed lips giving a fair resemblance of its tone. The tone is heard most fully in those parts of the chest which contain lung only — the right and left pulmonic regions.

The tracheal, bronchial, and vesicular sounds are each divisible into two periods, corresponding to the times of inspiration and expiration—the tracheal expiratory being nearly as long and as loud as the tracheal inspiratory murmur; the bronchial expiratory is of considerably shorter duration than the inspiratory, while the pulmonary expiratory is at the utmost one-fourth the length of the inspiratory murmur, weak in character, and in a great number of instances entirely absent. The relative duration of the inspiratory and expiratory murmurs is deserving of considerable attention, inasmuch as the first indications of disease are generally exhibited by the alterations which occur in their respective lengths, the vesicular expiratory, for instance, becoming either equal in duration and intensity, and in advanced disease longer and louder than the inspiratory murmur. Differences will of course be found in the respective duration of the murmurs in different healthy individuals; but it will be sufficient to remember, that in the majority of cases, the times occupied by these sounds are nearly in the ratio of three to one. Thus, if we suppose a healthy individual to breathe fifteen times in a minute, or once in four seconds, the times occupied by the periods of inspiration, expiration, and repose, will be one and a half, a half, and two seconds, respectively. Any prolongation of the expiration is made at the expense of the period of rest, which, as disease advances, becomes proportionally shortened, until it is found in many cases to be entirely abolished, when inspiration follows immediately upon expiration, with scarcely any interval of silence. Having studied the characters of these murmurs, let us briefly consider the causes which produce them, and the conditions which affect their propagation or conduction to the thoracic parietes. And, commencing with the inspiratory murmur, I must, in the first place, re-

mind you that the mass of air drawn into the lungs at each inspiration passes entirely through the trachea, and diverging into the right and left bronchial divisions, becomes subdivided into smaller and smaller streams, until the diameter of the terminal vibrating columns is reduced to one-fiftieth of an inch, the diameter of the ultimate bronchial ramifications. A distribution of this kind, which may be compared to the main-pipe and its branches of a system of gas-supply in a town, must evidently be so arranged that the air may travel from the main into its divisions, and from any trunk into its branches, with as little impediment as possible. From numerous measurements of the diameters of the bronchial tubes, which remain permanently open during the entire act of respiration, I have found that the sum of the squares of the diameters of the dividing channels is always greater than the square of the diameter of the tube from which they diverge, and that the proportion is maintained in such a manner that the stream of air can suffer but little impediment in the larger tubes from the mode of their division. The further bronchial divisions will not admit of accurate measurement, from their smallness and elasticity, but I think that an observation of the immense number of orifices which lead from them into the proper vesicular tissue of the lung, coupled with a knowledge of the existence of the law in the upper part of the respiratory tract, will enable us to decide upon the probability of a similar relation existing between a small bronchial tube and the ramifications which spring from it. You are aware that the walls of the respiratory tract are lined by a thin smooth membrane, which is preserved constantly moistened by the presence of a thin exhalation; that the walls under this membrane are composed of cartilaginous rings, which preserve the open condition of these air-channels, but that this character is gradually lost with the progressive sub-division of the bronchi, until the smaller tubes are found to consist of simple membrane. The inequality due to the rings must be one cause of friction, while the firmness of the walls must tend to increase and maintain the resonance of any sounds which may be formed or propagated within them. Another cause of friction is found in the divisions of the tubes, where their edges, presenting themselves in a direction opposed to the current of inspired air, act as vibrating tongues, which tend most materially to render the loudness of the inspiratory considerably greater than that of the expiratory murmur. The effect of the arrangement of these edges may be readily estimated by the simple act of blowing over the leaf and edge of a leaf of thin paper. The sound produced by the current of air impinging upon the flat surface of the leaf is very slight, but is immediately raised in loudness when the air is directed upon the edge; and from this simple illustration we may form an idea of the part which the multitude of bronchial divisions play in the production of the inspiratory murmur. Another, and by no means the least effective impediment to the current of the inspired air, is presented by the natural elasticity or resiliency of the lung—a power which offers considerable resistance to the entrance of atmospheric air, and proportional assistance to its exit from the chest. The nature of this power is seen in the facility with which a portion of the lung, which has been stretched, returns to its natural size, and the rapidity of the collapse of healthy

lungs upon the equalization of the atmospheric pressure upon their internal and external surfaces. There is considerable difficulty in estimating the amount which is capable of being exerted by this passive resistance, although the observation of pulmonary disease, and especially of emphysema, leads us to recognise its importance in the mechanism of the respiratory act. To quote the words of Dr. Carson, the ingenious experimenter, upon this subject:—"Two powers are concerned in regulating the movements, and in varying the dimensions and form of the chest, the elasticity of the lungs, and the contractile power of the diaphragm; of these powers, one is permanent and equable, the other variable, and exerted at intervals. The contractile power of the diaphragm, when fully excited, is evidently much stronger than its antagonist, the resiliency of the lungs, but the latter not being exhausted, takes advantage of the necessary relaxation of the other, and, rebounding like the stone of Sisyphus, recovers its ground, and renews the toil of its more powerful opponent." To determine the amount of this power, Dr. Carson instituted the following experiment: an apparatus was constructed, consisting of a glass globe connected with two tubes, of which one was vertical, and the other formed in such a manner as to be capable of being closely fitted into the trachea of any animal, the elastic power of whose lungs was required. The tube was placed into the trachea of a recently slaughtered bullock; water was then poured into the vertical tube, until it stood in it at a height of more than one foot above the level of the water in the globe; openings were now made in both sides of the chest, without perforating the pleura pulmonalis,—the lungs immediately collapsed, the water rising, and standing two inches higher than before. Now, as the only forces in action, at this time, were the pressure of the column of water and the contractile power of the lungs, it follows that we have, in this manner, a rude measure of the latter force, when circumstances admit of its full play. Similar experiments made upon sheep, calves, and dogs, proved that the elasticity of their lungs was measured by a column of water, somewhere near one foot in height, while in rabbits and cats it varied from a pressure of from six to ten inches. Dr. Carson having omitted to give us the dimensions of the apparatus employed, we are unable to calculate the exact amount of the pressure exerted in these instances. On referring, however, to Dr. Hutchinson's paper, we find, that in pumping air after death into the chest of an individual, a pressure of one and a half cubic inches of mercury, or nearly twelve ounces avoirdupois, upon every square inch of surface, was required to rupture the pulmonary substance, and we may therefore consider this amount to be the average elastic resilient power of the human lung.

From the sketch which I have given of the nature of the inspiratory murmur, we have seen that this sound, the result of friction, originates in, and is propagated along, the whole course of the respiratory tract—that its character and loudness at any point depend upon the velocity and volume of the air at that part, and that the tracheal, bronchial, and pulmonary murmurs are modifications of, and pass gradually into, each other. It may naturally be objected that the bronchial is distinct in itself, and is not observed to shade off into the vesicular murmur. This

consideration brings us to the last circumstance which affects the respiratory murmur; I mean, the nature of the pulmonary tissue as a body capable of conducting sound. There can be no doubt that a portion of healthy lung must, like cotton or wool, or any other substance which contains a quantity of air within its meshes or interstices, prove a bad conductor of sound, for any vibrations originating within it will have to pass from membrane to air, and from air to membrane, many hundred times before reaching the surface of the chest. I have already shown the non-conducting power of a non-homogeneous substance in the case of an effervescing fluid, stifling the vibrations of a glass containing it; and I think that the consideration of what I said at the commencement of my remarks upon the respiratory murmur will be sufficient to account for the presence of the vesicular murmur alone in every part of the chest, with the exception of those positions where the bronchi lie close to the thoracic parietes—viz., under the upper bone of the sternum and inter-scapular region.—*Lancet, Jan.* 26, 1850, *p.* 106.

Bronchial respiration.—When speaking of the normal respiratory sounds, I described the character of the bronchial murmur, and stated its position to be restricted to the upper bone of the sternum, and to the inter-scapular region. In disease, this sound may be found to occur in any portion of the chest, and to present every degree of intensity, from a weak, imperfect, and indeterminate tone, to a loud, distinct, and penetrating murmur, which is audible during inspiration and expiration, and, in the greater number of instances, of louder intensity during the latter than the former period. From the character of its tone, it has obtained the names of tubular breathing, bronchial souffle, and blowing respiration. Its position may be deeply seated within the pulmonary parenchyma, or superficial, and apparently immediately beneath the thoracic parietes. From the post-mortem examination of patients who have presented, just previous to death, well-marked bronchial respiration, we find the following conditions to be constantly present, and absolutely essential for the production of the sound:—

1. A bronchial tube, or space of certain size.
2. Consolidated or compressed lung,—*i.e.*, airless parenchyma surrounding the tube or space.
3. Absence of secretion in the tube or space, so that a perfect freedom of communication may exist between the cavity and the upper part of the respiratory passages.

A portion of lung thus circumstanced will be evidently entirely useless for the purposes of respiration, and we should naturally expect a diminution in the muscular action of that portion of the chest wall which is situated over the diseased pulmonary structure. Dr. Sibson's valuable paper, before referred to, supplies us with a corroboration of the view. In a note, he mentions the following as an instance:—"Dr. Barlow favoured me with the examination of a female affected with pneumonia of the lower lobe of the right lung. The movement over the diphragmatic ribs of the affected side was .1 inch; over the healthy side, .3 inch. The abdominal parietes, which had but little motion below the left tenth rib, actually fell in from .06 to .1 inch over the correspond-

ing point of the right side. This case is an additional proof that non-motion, or even reversed motion of the diaphragm on the affected side, is often an indication of pneumonia affecting the base of the lung." In many instances I have been able to verify this statement. And I believe we may most safely conclude, that the air circulates but slowly in a bronchus or space which is surrounded by a mass of consolidated or compressed lung, and that the opinion entertained by Andral, of the bronchial murmur being caused by the inspired air impinging with greater than the normal force upon the walls of a bronchial tube situated as above described, rests upon an entirely erroneous supposition. The more common explanation, which considers bronchial respiration to be simply the ordinary sound, normally occurring in the bronchi and abnormally conducted to the thoracic walls, by reason of the better conducting power of consolidated and compressed lung parenchyma, is, in my opinion, insufficient to account for the great intensity of the sound occasionally found in cases of pneumonia and tubercular consolidation. The bronchial breathing is often as distinct as if the patient were blowing direct into the stethoscope, and in many cases as loud as the tracheal murmur itself, and this, in a tube which must be considerably smaller than the trachea, and situated at some distance from the chest-wall. This loudness of tone cannot be the result of simple conduction, on the contrary, some of the vibrations must be lost in their passage through the lung substance, however homogeneous it may have become, and all of them be weakened by the time they have reached the parietes of the chest. Again, it is impossible to imagine that the normal pulmonary murmur should be able to drown and entirely mask a sound which, as I have already stated, often equals the tracheal and laryngeal respiration in intensity, especially when we remember that the normal expiration is almost inaudible, and therefore incapable of producing such a result.

I would rather adopt the view of Prof. Skoda, who explains the existence of abnormal bronchial respiration upon the principles of the doctrine of consonance; but I would admit, what this author is unwilling to allow, that the sound is transmitted with greater facility through consolidated than through healthy air-containing lung. Zehetmayer gives the following brief account of this author's theory:—"The vibrations which produce murmurs in the larynx, trachea, and bronchi, are necessarily propagated to a column of air, which stagnates in a bronchial tube, surrounded by consolidated lung parenchyma. This column is thrown into similar vibrations, the sound produced in the upper part of the air passages being found to consonate in it with the same strength with which it is perceived at its seat of origin. While now, the respiratory sound is heard merely as a weak murmur in the neighbouring healthy part, (the normal lung parenchyma being, on account of its spongy structure, a bad conductor of sounds originating within it), the sound which extends from the larynx and trachea, becoming concentrated in the blind-ending bronchus, is still further increased by reflexion from the firm walls, and finding a good conductor in the solid lung-substance, reaches the ear of the auscultator with the same intensity as the murmur at the larynx. Bronchial respiration is therefore the

consonance of the respiratory sounds of the larynx and trachea in the column of air contained in a bronchus, which traverses a portion of consolidated lung parenchyma." As the natural bronchial expiratory is louder than the natural bronchial inspiratory murmur, so the abnormal expiratory will be louder than the abnormal inspiratory murmur. Consolidation being the chief condition essential to the existence of bronchial respiration, the sound will be found to be present in the second stage of pneumonia, (principally found at the base and posterior part of the lung), in tubercular solidification of the apices, in bronchial dilatations surrounded by airless parenchyma, in consolidation which results from the coagulation of simple fibrine, (apoplexia pulmonum), and, in fact, whenever a considerable portion of the cells and smaller bronchi has become blocked up by any kind of solid matter whatever. It must be added, however, that a patch of consolidated lung may be so centrally situated, and so covered by a stratum of healthy lung, as to present no stethoscopic sign, and even no symptom, upon percussion. Although somewhat out of place, I may mention, with respect to the occasional fallacy of percussion, or rather its failure to detect consolidated lung, that an interesting case is recorded by Dr. Graves, in his clinical lectures, where an extensive tubercular consolidation of the apices was attended by a full, clear sound upon percussion, the portions of healthy lung between and above the tubercular masses being sufficient to counteract the dulness resulting from the diseased pulmonary structure.—*Lancet, Feb.* 23, 1850, *p.* 228.

46.—*New Mode of Percussion.*—M. Poirson, intèrne at the Salpétrière, introduced a novel mode of percussion, which consisted in the employment of a common sewing thimble placed on the fore or middle finger, so as to include a small quantity of air between the end of the finger and the bottom of the thimble. This instrument communicates a clearness and intensity to the sounds which enables the physician to detect variations not indicated by the finger alone.—*Med. Gazette, Jan.* 25, 1850, *p.* 163.

47.—ON THE PATHOLOGY AND TREATMENT OF PULMONARY PHTHISIS.

By Dr. J. Turnbull, Physician to the Liverpool Infirmary.

[Dr. Turnbull believes that there is more evidence than is generally supposed in favour of the curability of phthisis. He remarks that, when patients recover after presenting all the usual symptoms, it is too common for medical men to distrust their diagnosis, and to take the fact of recovery as a proof that the disease could not have been tubercular phthisis. Against this mode of reasoning he protests. Upon the *Pathology* of the disease, Dr. Turnbull makes the following remarks:]

Let us inquire, as briefly as possible, what light has been thrown on the pathology of tubercle, and the changes it undergoes during absorption

and transformation, by recent chemical and microscopical researches. As regards the blood itself, from which it is an exudation or secretion, the only change of any importance which seems to have been yet discovered, is an increase in the quantity of fibrin; but this does not seem due so much to the tuberculous diathesis, as to the inflammation which accompanies the softening of tubercle. The proportion of blood corpuscles is generally below the standard of health; but Becquerel and Rodier have shown that this is a change common to all chronic diseases, and much more marked in chlorosis.

Analysis of tubercle itself has shown, that it consists chiefly of albumen, with a little casein and fibrin, a considerable quantity of fat, and some extractive matters, probably the creatine and creatinine discovered by Liebig in the muscles and urine. Dr. Madden thinks that the abundance of extractive matters shows that there is either diminution of healthy excretion, or undue activity of the decomposing forces. The former he has taken as an indication for the use of means to promote the function of the excreting organs—the skin, liver, and kidneys. Crude yellow tubercle contains only about 2 per cent. of earthy salts, and 98 per cent of animal matter; but, when it has undergone the cretaceous transformation, the proportions are reversed, the quantity of animal matter being about 3 per cent., and the remainder consisting of earthy salts, carbonate and phosphate of lime, with a little muriate of soda.

Tubercle being an exudation from the blood of a part of the liquor sanguinis, imperfectly vitalized, and therefore less highly organized than the fibrinous exudations of healthy inflammation, we naturally expect to find—what chemists have discovered in regard to its ultimate analysis—that it differs very little in composition from the proteine compounds. These facts, it must be confessed, are almost negative, as regards any practical value.

Microscopical researches have thrown more light on the pathology of tubercle; and we have thus derived some information as to its primary seat, its structure, its relations to surrounding parts, and to other deposits of a healthy or morbid character. Dr. Carswell thought that the air-cells were the usual seat of tubercles in the lungs; and that, whenever mucous membrane formed a part of an organ, it was either the exclusive seat, or more extensively affected than any of the other tissues. There seems to be much reason to believe, that the air-cells are the common, though not the exclusive, seat of tubercular deposit. I lately examined a specimen of crude tubercle, where it was beautifully seen filling the cells. Mr. Rainey has described its appearance in the air-cells, and says, that it may sometimes be seen filling only one part of a single cell. He has endeavoured to show that the cells are not lined with mucous membrane, but the fact observed by Hassall, of the epithelium extending into them, appears to show that they are lined by this membrane. Different microscopical observers have shown that it may also be deposited in the intercellular tissue between the air-vesicles; in fact, anywhere external to the vessels; and Dr. C. J. B. Williams thinks it probable, that it may even form within the blood-vessels themselves.

Microscopical examination of tubercular matter has shown that it consists of corpuscles, which are characteristic of tubercle, and of granules and minute molecules. The corpuscles have no nuclei, and are considered to be undeveloped cells, which approach more or less nearly to the exudation or plastic cells of healthy inflammatory deposits. The miliary tubercle has some appearance of cells and fibres, but the crude yellow tubercle has no appearance of organization, and during softening, the corpuscles swell, burst, and discharge granules. Dr. Williams's view—that lymph, tubercle, and pus, are only modifications of each other—shows how nearly tubercular deposition and inflammation must approach each other; and pathologists seem now agreed that they are closely allied processes, both being modified states of nutrition. Growth, nutrition, inflammation, and scrofulous diseases, are, observes Dr. Addison, analogous phenomena.

Besides the objects already described, there are also seen in tubercles the filamentous remains of the air-cells, fat globules, which increase in quantity as the softening takes place, pus, and other exudation products of inflammation, and epithelium cells; and in cretaceous tubercles, large dark particles, and crystals of cholesterine.

Of these facts, furnished by microscopical examination, perhaps the most important, in reference to our present inquiry, is that of the tubercular corpuscles being most nearly allied to the fully developed cells of healthy inflammatory products, from which they appear to recede, and assume more of a granular aspect, in proportion as they become yellow and cheesy, or soften. "The miliary tubercle," Dr. C. J. B. Williams observes, "differs from fibrin, not in kind, but in degree, of vitality and capacity of organization"; and this proves to us what experience had previously taught—the importance of removing the complication of inflammation or congestion of the lungs, in the prevention, as well as treatment of phthisis.

[Dr. Turnbull proceeds to make the following observations on the *Treatment* of phthisis.]

The researches which have been made in the present day in chemistry and physiology, have tended more and more to prove the connexion between deranged assimilation and many diseases; and in struma, Dr. Prout has observed that all the assimilating processes are at fault, but chiefly those which take place between the duodenum and the circulating system, and by which the chyle is converted into blood. It is also well worthy of notice, that tubercles may be produced in some of the lower animals by confining them in damp places, and feeding them on unwholesome food. This was done with rabbits by Drs. Baron and Jenner, and by Dr. Carswell; and it is a fact of some importance, as well in reference to the curability of tubercular diseases by absorption, as in showing the power of good alimentation, that the tubercular disease has been removed by feeding them afterwards on more nutritious food. In some kinds of insects, too, it has been found that a tubercular deposit may be produced by feeding them on bad food, and repeatedly plunging them in cold water. The same influences operate on man; for Dr. Baly has shown,

that mental depression and confinement cause a remarkable increase in the mortality among the inmates of prisons, and that this is chiefly produced by consumption and scrofula. Such facts show us the importance of hygienic means of treatment; and, viewed in connexion with the power of cod-liver oil in promoting the assimilation of the food, they prove to us forcibly the necessity of bringing the digestive organs into as healthy a state as possible, in order to effect the most perfect assimilation of light nutritious articles of diet.

We have already shown, that inflammation and tubercular deposition are allied processes; and the effect of local irritation, in producing pulmonary consumption, is exemplified in the frequency of the disease in persons whose occupations cause them to inhale silicious or metallic particles; and I have no doubt that the fact, noticed by Phillips, of consumption being most prevalent in towns, and scrofula less so, while the reverse occurs in the country, arises, not, as he supposes, from any difference between these diseases, but, in a great measure, from the inhalation of particles of dust and smoke determining the deposition of tubercular matter in the lungs instead of the external parts. In all our efforts to cause the absorption of tubercles, it must, therefore, be a matter of primary importance to prevent irritation, and to remove inflammation or congestion of the lungs by the usual means—local depletion and counter-irritation more especially. The action of all the depurating organs which purify the blood by removing from it the products of the worn-out tissues, should be promoted by the appropriate means; and, with the view of preventing catarrhal irritation at the earliest period, I believe that there is no means so effectual as washing the whole surface with tepid or cold salt and water, followed by friction, which excites the depurating function of the skin, fortifies it against the impression of cold, and acts as a general tonic.

The condition of the blood, as ascertained by Andral, and subsequently by Becquerel and Rodier; furnishes another important indication in the treatment of phthisis, and one which has been found practically useful. In the earliest stage, and perhaps in some cases also before the formation of tubercles, the proportion of globules is below the healthy standard: as the disease progresses the quantity falls; and in one case, Andral found the proportion as low as 72 parts in 1000 of blood. In this respect, consumption bears a resemblance to chlorosis, and in the diminution of the red globules, we have, in the one disease as well as the other, an indication for the employment of chalybeate tonics. I may here observe that, though we have this diminution of the red globules, we are seldom able to discover a loud continuous murmur in the veins of the neck, which is so common a sign in chlorosis; This difference I account for, from there being in chlorosis not simply a diminution of the red globules, but also an increase of the aqueous part of the blood. The veins are thus kept in a state of tension, which is favourable to the production of the venous murmur. In consumption, on the other hand, especially when the disease is in an active state, there is a diminution not merely of the globules, but of the whole quantity of blood in the system, which with the relaxed state of the tissues arising from loss of flesh, prevent the degree of venous

tension necessary for the full development of this murmur. When, however, the tubercular disease has become quiescent or has receded, I have sometimes observed the occurrence of a continuous murmur in cases where it had at first been absent; and this I have considered a favourable sign.

There are three ways in which recovery from consumption may take place; first, by the shrivelling of miliary tubercles; secondly, by the transformation of crude yellow tubercles into cretaceous or calcareous concretions; thirdly, by the healing of cavities. We have, now, fourthly, to show that the results of treatment seem to prove that tubercles may be removed by absorption. We cannot, however, have ocular proof of this, and hence there has been doubt as to the possibility of the removal of tubercles in this way; but the facts I have still to adduce will tend still further to remove any doubt on this point.

The remedies which, I think, have most claim to our attention as agents capable of promoting changes in tubercular matter, are *mercury*, *iodine*, the *alkalis*, and *cod-liver oil*.

As *mercury* is unquestionably the most powerful remedy we possess, for promoting absorption of the serous and fibrinous exudations of acute inflammation, we would naturally expect that it should have some power in causing absorption of tubercular deposits; but it would seem that in proportion as they recede from and lose the characters of plastic organizable fibrin, they are less under the sorbefacient influence of this remedy; and in ordinary cases of consumption, not distinctly produced by acute inflammation, mercury, though occasionally useful as an alterative to promote the biliary and other secretions, is injurious when given so as to act upon the constitution—producing a debilitating effect, and hastening the softening of tubercles.

The preparations of *iodine* have some resemblance to mercury in their effects, but unlike this remedy, they are not of any service in acute disease, but are more useful in causing the absorption of tubercular deposits, especially in glandular structures. The syrup of the iodide of iron is the preparation I have most frequently used, as it combines the absorbent properties of iodine with the tonic power of iron, and thus fulfils the indication in reference to the diminution of the globules of the blood. I regard it as one of the best tonics we can use in the early stage of the disease, and I think that I have seen the early symptoms of phthisis arrested by it in a few cases.

Before the introduction of iodine, the *alkalis* were regarded as remedies of considerable absorbent power. Liquor potassæ is a powerful alterative medicine, and it has sometimes been found to cause absorption of an enlarged gland even after iodine has failed. Dr. Campbell recommended it very strongly in phthisis; and Sir J. Clarke has observed, that the alkalis increase the urinary, and appear to promote the bilious secretion, and to render that of the mucous membranes more fluid: in whatever way they operate, they are certainly beneficial in many tuberculous affections. Their power of promoting absorption of the lymph and other exudation products of inflammation of the lungs or pleura, especially when combined with iodine, is a fact of acknowledged practical value. Dr. Golding Bird has communicated some most interesting and

useful information as to the action of alkaline remedies; he calls them depurating or chemical diuretics, and has shown that, unlike most diuretics, they increase not only the fluid, but also the solid parts of the urine. This they do by a chemical action on the exhausted and worn-out tissues; and he thinks that parts of low vitality, such as tubercle, will be most readily acted on by these chemical agents. It is also worthy of notice, that the caustic alkalis are the most powerful solvents of tubercle; and it is therefore reasonable to suppose that they will retain a portion of that power, when circulating with the blood in the capillaries.

Cod-liver oil has been known as a remedy for consumption and scrofula in Germany and the north of Europe for a considerable period, and Dr. Hughes Bennett has the merit of having brought it into notice in this country. Of the three kinds of oil, the pale, the light brown, and the brown, it has been thought in Germany that the darkest colour is the most useful; and this opinion was supported by Dr. Bennett, and is still maintained by Dr. De Jongh. It seems, however, to be now sufficiently well ascertained, that the brown has no superiority over the pale oil. I have seen the best effects speedily produced by the purest specimens of pale oil. Dr. Williams used the pale oil prepared according to Donovan's method: and in the report of the Hospital for Consumption, it is stated that "different qualities of oil, have been tried without exhibiting any marked difference in the remedial effects; but the offensiveness of some of the darker kinds renders their general use impracticable." There are very few cases in which the pale oil cannot be taken; and if we begin with a tea or dessert spoonful and gradually increase it to an ounce thrice a day, on the surface of peppermint-water or milk, there are few persons who do not take it with facility, and become reconciled to it. When it causes nausea, naphtha or hydrocyanic acid will usually remove this symptom.

The power of this remedy in controlling the progress of phthisis in a large proportion of cases, and even of arresting its progress in not a few, has now been completely established, and the Hospital for Consumption has even furnished us with statistical facts as to the results of treatment in each stage of the disease.

In Dr. Bennett's work, we are furnished with three cases, fully detailed, of decided consumption, where recovery took place under the use of this remedy. In the appendix to the last edition, he says: "I have succeeded, in several cases, in ascertaining that the caverns have completely healed up, every symptom and physical sign indicating their presence has disappeared, and there has remained only slight dulness on percussion, and increased vocal resonance, as a proof of the puckering and induration of the pulmonary parenchyma attendant on the cicatrix.

[For the strongest evidence in support of the utility of cod-liver oil, Dr. Turnbull refers to the testimony of Dr. Williams, and to the Report of the Brompton Hospital. (See 'Retrospect,' vol. xix, p. 87, and vol. xx, p. 369.)—*Lond. Journ. of Med., Feb.* 1850, *p.* 105.

48.—ON THE TREATMENT OF PHTHISIS.

By Prof. J. H. Bennett, Edinburgh.

I think we are warranted in drawing the conclusion, that if, during the advanced period of phthisis pulmonalis, those means can be discovered which check further tubercular exudation, and keep up the strength and nutritive processes of the economy, that such exudations as have occurred will be rendered abortive, and that even large ulcerations will heal up and cicatrize. The important point practically is to ascertain what these means are, and how they may be put into operation.

Now a careful examination of phthisical cases will, I think, show that the great obstacle the practitioner has to contend with are the dyspeptic symptoms, which render all his efforts at nourishing the patient in the ordinary way useless. Such individuals have a most capricious appetite, frequently loathe all kinds of animal food, and it will be found that even when they *say* that the appetite is good, and that they live well, the diet actually consumed is either deficient in quantity or quality. Nothing, again, is more common in the progress of such cases than the temporary improvements which follow a change of diet, of locality, or of temperature. How frequently do poor patients, on coming into an hospital, get better merely from enjoying rest and the regular diet of the institution. How often, after a short journey, or on reaching what has been considered a favourable locality, are the friends of consumptive patients in the higher classes rendered happy by the temporary marked improvement which takes place. I consider that such amendments will always be found commensurate to the stimulus given to the nutritive processes of the economy.

An observation of the circumstances which precede the disease, or its so-called causes, clearly indicate imperfect digestion and assimilation as its true origin. Thus phthisis is essentially a disorder of childhood and youth—that is, a period of life when nutrition is directed to building up the tissues of the body. Diminish the proper quantity of food taken by a healthy man, tubercular diseases are not induced, but if this be attempted with children or young persons, they are a most common result. Thus scrofula and tubercle are not prevalent in armies and fleets whatever privations they may be exposed to; but they abundantly exist in foundling hospitals, factories, and among the young of the poor and labouring classes of the community, and especially among tailors, sempstresses, and others who follow sedentary employments. In the higher classes they result from imperfect and insufficient lactation during infancy, or the irregular diet caused by carelessness or over-indulgence. No doubt they may frequently be observed in persons whose parents or relatives have been similarly affected. From facts of this kind, it has been supposed that hereditary predisposition, a vitiated atmosphere, changeable temperature, certain occupations, humidity, particular localities, absence of light, and so on, predispose to phthisis. Very frequently several of these are found united, so that it is difficult to ascertain the influence of each. When they so operate, however, they invariably produce, in the first

place, more or less disorder of the nutritive functions, and are associated with dyspepsia, or other signs of mal-assimilation of food.

From a study of the symptoms, causes, morbid anatomy, and histology of phthisis pulmonalis, we are, therefore, led to the conclusion, that it is a disease of the primary digestion, causing, 1st, impoverishment of the blood; 2d, local exudations into the lung, which present the characters of tubercular exudation; and, 3d, owing to the successive formation and softening of these, and the ulcerations which follow in the pulmonary or other tissues, the destructive results which distinguish it. Further observation shows, that circumstances which remove the mal-assimilation of food frequently check further tubercular exudations, while those which previously existed become abortive, and that occasionally more extensive excavations in the pulmonary tissue may, owing to like circumstances, heal up and cicatrize.

The foregoing considerations render it evident, that the cure of phthisis by art will be proportionate to our power of regulating the nutritive powers in that disease, and controlling those circumstances which induce, 1st, the diseased constitution of the blood; 2d, the local exudation; and, 3d, the ulceration of the pulmonary tissue. A discussion of these subjects would lead us into a history of nutrition and exudation, with its results. Referring to the February number of the Monthly Journal for observations on the latter part of the subject, I shall content myself at present with a short resumé of what I have formerly published, as to the nature of the altered nutrition which exists in phthisis pulmonalis, and other tubercular diseases.

A healthy nutrition of the body cannot proceed without a proper admixture of albuminous and oleaginous elements. This may be inferred from the physiological experiments of Tiedemann and Gmelin, Leuret and Lassaigne, Magendie, and others; from an observation of the constituents of milk, the natural food of young mammiferous animals; from a knowledge of the contents of the egg, which constitute the source from which the tissues of oviparous animals are formed before the shell is broken; and from all that we know of the principles contained in the food of adult animals. The researches of chemists, such as those of Prout, Liebig, and others, point to the same generalization, when they assert that carbonised and nitrogenised food are necessary to carry on nutrition, inasmuch as oil is a type of the one, and albumen of the other. The chemical theory is imperfect, however, because it does not point out *how* these elements form the tissues; for it is not every form of carbonised or of albuminous food that is nutritious, but only such kinds of them as are convertible into oil and albumen.

The reason of this was first pointed out by Dr. Ascherson of Berlin, in 1840, and made known by me to the profession in this country in 1841. I have since endeavoured to show that the elementary molecules formed of a particle of oil, surrounded by a layer of albumen, which are produced, as he described, by rubbing oil and albumen together, are not developed directly into blood-globules and other tissues, as he supposed, but must first pass through a series of transformations, a knowledge of which is highly important, not only to a comprehension of nutrition generally, but especially to that anormal condition of it which occurs in

phthisis. Thus the successive changes which occur for the purposes of assimilation in the healthy economy may be shortly enumerated as follows:—1st. Introduction into the stomach and alimentary canal of organic matter. 2d. Its transformation by the process of digestion into albuminous and oily compounds: this process is chemical. 3d. The imbibition of these through the mucous membrane in a fluid state, and their union in the termini of the villi and lacteals to form elementary granules and nuclei; this process is physical. 4th. The transformation of these first into chyle corpuscles, and, secondly, into those of blood, which is a vital process. It is from this fluid, still further elaborated in numerous ways, that the nutritive materials of the tissues are derived; so that it must be evident, if the first steps of the process are improperly performed, the subsequent ones must also be interfered with. Hence we can readily comprehend how an improper quantity or quality of food, by diminishing the number of the elementary nutritive molecules, must impede nutrition.

The peculiarity of phthisis, however, is, that an excess of acidity exists in the alimentary canal, whereby the albuminous constituents of the food are rendered easily soluble, whilst the alkaline secretions of the saliva and of the pancreatic juice, are more than neutralized, and rendered incapable either of transforming the carbonaceous constituents of vegetable food into oil, or of so preparing fatty matters introduced into the system, as will render them easily assimilable. In consequence, more albuminous than fatty matters enter the blood, and the necessary waste of structure is supplied by the absorption of the adipose tissues of the body. Hence the emaciation which characterizes the disease. In the meanwhile, the lungs not having so much carbon to excrete in the form of carbonic acid, become especially liable to local congestions, leading to exudation of an albuminous kind, which is tubercle. This, in its turn, being deficient in the necessary proportion of fatty matter, elementary molecules are not formed so as to constitute nuclei capable of further development into cells,—they therefore remain abortive, and constitute tubercle corpuscles. Thus the local disease is added to the constitutional disorder, and that compound affection is induced, which we call phthisis pulmonalis—consisting of symptoms attributable partly to the alimentary canal, and partly to the pulmonary organs.

To improve the faulty nutrition which originates and keeps up the disease, it is of all things important, therefore, to cause a larger quantity of fatty matter to be assimilated. A mere increase in the amount, or even quality of the food, will often accomplish this. The treatment practised, some years ago, by Dr. Stewart, of Erskine, which consisted in freely administering beef-steaks and porter, and causing exercise to be taken in the open air, excited considerable attention from its success. I have been informed, that in some parts of America the cure consists in living on the bone marrow of the buffalo, and that the consumptive patient gets so strong in this way, that he is at length able to hunt down the animal on the prairies. All kinds of food rich in fat will not unfrequently produce the same effects, and hence the value long attributed to milk, especially ass's milk—the produce of the dairy, as cream and butter, fat bacon, caviar, &c.

But, in order that such substances should be digested and assimilated, the powers of the stomach and alimentary canal must not have undergone any great diminution. In most cases it will be found that the patient is unable to tolerate such kind of food, and that it either lies undigested in the stomach, or is sooner or later vomited. Under these circumstances, the animal oils themselves are directly indicated, by giving which, we save the digestive apparatus, as it were, the trouble of manufacturing or separating them from the food. By giving considerable quantities of oil directly, a large proportion of it is at once assimilated, and is rendered capable of entering into combination with the albumen, and thereby forming those elementary molecules so necessary for the formation of a healthy chyle. Such, it appears to me, is the rationale of the good effects of cod-liver oil.

Since I introduced this substance to the notice of the profession as a remedy for phthisis, in 1841, I have continually prescribed it in hospital, dispensary, and private practice. I need not, perhaps, say, that I have given it in a very large number of cases, and have observed its effects in all the stages of the disease, and under almost every circumstance of age, sex, and condition. I have had the most extensive opportunities of examining the bodies of those who have died after taking it in considerable quantities, and am still observing the cases of many persons who may be said to have owed their lives to its employment. Further, I have carefully watched the progress it has made in the good opinion of the professional public, and perused all that has been published regarding it in the literature of this and other countries. It were certainly easy for me, therefore, to write at great length on this subject; but I do not see that anything of utility could be added to what I have already published. The following is a summary of my views regarding cod-liver oil, as a remedy for phthisis:—

1. Cod-liver oil is, as M. Taufflied pointed out, an *analeptic*, and is indicated in all cases of anormal nutrition dependent on want of assimilation of fatty matter.

2. It is readily digestible under circumstances where no other kind of animal food can be taken in sufficient quantity to furnish the tissues with a proper amount of fatty material,

3. It operates by combining with the excess of albuminous constituents of the chyme, and forming in the villi and terminal lacteals those elementary molecules of which the chyle is originally composed.

4. Its effects in phthisis are to nourish the body, which increases in bulk and in vigour; to check fresh exudations of tubercular matter, and to diminish the cough, expectoration, and perspiration.

5. The common dose for an adult is a table-spoonful three times a day, which may often be increased to four, or even six, with advantage. When the stomach is irritable, however, the dose to commence with, should be a tea or dessert-spoonful.

6. The kind of oil is of little importance therapeutically. The pure kinds are most agreeable to the palate; but the brown coarser kinds have long been used with advantage, and may still be employed with confidence whenever cheapness is an object.

7. I have never observed its employment to induce pneumonia—as it has been lately supposed to do by Dr. Benson. On the other hand, nothing is more common than to find after death more or less pneumonic condensation around tubercles.

8. Neither have I ever been able to trace fatty liver or kidney to its use, however long continued, although such complications of phthisis are also exceedingly frequent.

[Dr. Bennett relates a number of cases which he considers to be *cures* of phthisis, effected by treatment conducted according to the foregoing considerations. He cautions us, however, against the idea that cod-liver oil is alone sufficient to cure phthisis, or that other means and precautions may be neglected with impunity. He observes:]

In the early stages its management is not so difficult, and is comparatively much more successful; not, indeed, that even then it is always easy to overcome the dyspepsia and other causes which tend to produce and keep up the disorder. I have pointed out, in another place,* that when the stomach is deranged, it often requires a variety of remedies, to counteract its irritability and acidity, before nutritive substances can be taken. In other instances, however, especially when it exists in the half-starved poor, food is taken readily, and then amendment is generally soon observed. Again, although cod-liver oil may for a time be digested, it not unfrequently after a time causes nausea, and cannot be tolerated, and under such circumstances chalybeates, with tonics, constitute valuable auxiliaries.

The complications and occasional symptoms which occur in this disease, present a wide field for the judicious interference of the physician, who will achieve more by saving his patient from unnecessary drugs, and giving nature fair play, than by what is called "doing something." For instance, I have never been able to satisfy myself of the advantage of giving mineral acids to check the perspirations. In such cases the stomach is generally already too acid; the albuminous matters are easily digested, whilst the oily principles are not. Surely acids will not improve this condition, but rather alkalics, as recommended by Dr. Campbell, which I have always found very useful in certain states of the digestive process. If the recent researches of Bernard on the functions of the pancreas be attended to, it would appear that the secretion of that organ is alkaline, and necessary for the assimilation of fatty matters. It is very possible that the peculiar dyspepsia of phthisical cases is connected with a deficient secretion of the pancreatic juice. But not to enter upon speculations of this kind, I regard it as an undoubted fact, that the perspirations in phthisis are only evidences of the weakness of the individual. Restore his appetite and power of digestion, increase his strength, and the sweatings disappear. This is not to be done by giving sulphuric or nitric acid, but by cod-liver oil, and a wholesome diet.—*Month. Journal, March and May*, 1850, *pp.* 234 and 401.

* Lectures on Clinical Medicine, part I., p. 43.

49.—*On the Influence of Moral Causes in the Production and in the Treatment of Phthisis.* By Dr. J. F. Duncan, Physician to Sir P. Dun's Hospital, Dublin.—[Dr. Duncan appeals to the ordinary experience of the profession, whether pulmonary consumption does not usually occur "in persons whose temperament is peculiarly liable to be affected by moral impressions." He thinks that this fact will to a great extent explain the prevalence of the disease among particular classes of persons and at particular times of life; observing with respect to the latter,]

There appear to be three periods at which the mortality of phthisis exhibits a maximum intensity. First, that immediately succeeding birth; secondly, that which commences at the epoch of puberty; and, lastly, that which corresponds to the decline of mature life. The first takes place at a period when moral causes can have no influence either in exciting or aggravating the liability; it is hence due to the force of constitutional predisposition almost exclusively. The other two are the result, in part at least, of moral causes, which act at these periods of life with more than usual intensity.

[Dr. Duncan endeavours to elucidate the action of the emotions in the causation, and the treatment or prophylaxis of the malady, in the following manner:]

Simon, in his 'Animal Chemistry,' vol. ii. p. 479, states the formula for crude pulmonary tubercle to be $C^{13}\ H^{35}\ N^{5}\ O^{13}$, while that for protein is $C^{48}\ H^{36}\ N^{6}\ O^{14}$; in other words, tubercle consists of an imperfect protein, differing from it in the absence of five atoms of carbon, one of hydrogen, and one of oxygen. Protein is the starting point of all the tissues, and the primary compound principle of fibrine, albumen, and casein. It is, of course, the natural result of the process of digestion, when healthily performed. When this process, from any cause, is interfered with, the proper combination of the organic atoms does not take place, and a less soluble product is formed than what the necessities of the system require. Now, it is easy to see that the depressing passions must, to a very considerable extent, operate in this way. All the secretions are under the influence of the emotions to a remarkable degree. Intense sorrow suspends the secretion of the gastric juice. Sudden fright stimulates the kidneys to unwonted activity. Anger arrests the action of the liver. Even the tears do not flow when grief is very violent. Is it at all surprising that a slighter degree of these emotions, acting slowly, but not less certainly, should interfere with some of the deeper processes of digestion, or prevent the full development of a healthy fluid?

Exhilarating impressions, on the contrary, have an opposite effect, causing these processes to take place with greater rapidity and force, and so purifying the system of every stagnant element that might accumulate and become prejudicial. Even ordinary occupation must have some effect in this way, by imparting tone to the various organs immediately concerned, and by permitting them to pursue quietly and without disturbance their proper functions.*

*It is scarcely necessary to remind the reader that the opinion here advocated is strictly in accordance with what has been already published by Sir James Clarke under the head of tuberculous cachexy, and by Dr. Todd under that of strumous dyspepsia, as occurring antecedently to the actual development of tubercle, and preparing the way for it.

The practical utility of this view of the subject consists, first, in directing us to proper modes of managing those individuals who are born with an hereditary tendency to the complaint, but in whom the constitutional bias is not so great as to prove immediately destructive to life. In all such cases I believe it to be of the utmost importance in addition to proper hygienic treatment, to have the mind profitably employed in some manner suitable to the tastes and capacity of the individual. I do not, of course, mean to say that the powers are to be overtasked by protracted occupation, and without corresponding relaxation. Such persons are not formed for great exertion, either mental or corporeal. But it is one thing to give them employment sufficient to occupy and exercise their faculties, and it is another to impose upon them a burden to which they are unequal. Cheerful society should, in all cases, be provided for them. In determining the nature of the employment, much must be left to the judgment of the medical man, and still more to the taste of the individual. Mere amusement, however it may please for the moment, will not answer for a continuance; it palls in the enjoyment, and the mind necessarily pants after that active and industrious exertion of its faculties which is the original condition of its existence.

The same holds equally true at a later period, when, the disease having developed itself by unequivocal signs, a change of climate comes to be considered, with the view of arresting its progress. I believe that far too much attention has been bestowed upon the mere atmospheric conditions involved in this measure, and far too little on the accidental circumstances associated with it. Every one must admit, that after all the study which has been bestowed upon the subject of climate, very little information of a satisfactory nature has been obtained. We find some writers recommending a moist climate for the invalid, some a dry one, some a moderately warm, and others a moderately cold one; while in almost all these places, if accurate information could be had, the frequency of the disease would, probably, be found to differ very little from what exists at home. I am very far from wishing to discourage a change of climate in the early stages of consumption; I believe that it is often attended with striking and decided benefit, but I am anxious to call attention to the *adjuvantia* and *lædentia* inseparable from it. Among the former may very frequently be enumerated, removal from unpleasant circumstances, or the want of suitable society at home; the excitement of visiting foreign countries, with their peculiar manners and habits; new associations formed on the journey; and the opportunities of mental improvement in various ways. On the other hand, it must not be forgotten there are drawbacks in the separation of the individual from his family and friends; the inconvenience arising from the want of many comforts to which he may have been accustomed; the accidental circumstance of his meeting with companions of a congenial disposition with his own; the absence of all taste for the attractions which the countries visited may present: these, and many other circumstances, contribute materially to counteract all the advantages that the best-selected climate can possibly afford.

I knew one young gentleman brought up to mercantile business, and destitute of those resources within himself which spring from a liberal education, who went abroad for change of air when labouring under

consumption. Though most amiable in disposition, he was little else than a walking vegetable; he took no pleasure in reading or in the improvement of his mind. Even the passing topics of the day seemed to have no attraction for him. All his enjoyment seemed to be centred in his family. Fortunately for him, his mother and sisters were able to accompany him, as otherwise I have very little doubt that the fatal issue would have been accelerated rather than retarded by the removal.

The following cases illustrate the opposite view of this question. They are those of two brothers, whose mother died of the complaint. The elder I did not see previously to his departure for Italy, but I have little doubt, from the medical treatment abroad, that he really laboured under the disease. He was a young man of cultivated mind, of an ardent temperament, and considerable ability. During his residence on the continent, he occupied himself, not only in seeing the lions of the several places he visited, as tourists usually do, but he took sketches of the scenery, and copied the details of many of the models of architecture for which the Roman capital is so celebrated; a circumstance that has proved of immense advantage to him in the profession of an engineer, which he has adopted since his return. Of his brother I can speak more decidedly. In addition to the predisposition which he inherited from his mother, evidenced in his thin figure, clear blue eyes, and great height, in proportion to his age, he had distinct physical evidences of the formation and softening of tubercular matter at the apex of his right lung. This I had ascertained at midsummer, a few years ago, as he was preparing to enter the university. At my suggestion, his studies were abandoned, and the family removed to the county Wicklow, where, in addition to the mildness of the air, he enjoyed the opportunity of boating on the sea in company with some young persons of his own age. All this had a most marked and beneficial effect upon his system, and, though he retained many symptoms of delicacy, all the signs of tubercular excavation disappeared. In the autumn of that year, his brothers got an engagement as engineers to a projected railway in Spain, and they proposed to him to accompany them, and they would give him employment. The offer was cordially accepted; he entered with alacrity into the duties of his new office, and was soon able to endure a degree of fatigue which he could not previously have attempted; and even to wade through rivers without changing his clothes, and without the slightest subsequent ill effect. He has, since then, returned to this country in perfect health, and has remained well ever since. I am aware that it may be said the beneficial result experienced in his case was due to the change of climate solely, and not to the mere circumstance of his having procured congenial employment; but from inquiries that I have made from him, I have reason to believe that Spain, especially that part of it where he was stationed, is anything but favourable to the consumptive invalid; the natives frequently fall victims to the disease; and the weather is exceedingly trying to a delicate constitution.—*Dublin Quart. Journal, Feb.* 1850, *p.* 22.

50.—*On Gangrene of the Lung.* By Dr. W. STOKES, Regius Prof. of Physic in the University of Dublin.—[At the termination of a paper upon this subject, Dr. Stokes draws the following conclusions:]

1. That gangrene of the lung is met with under a variety of forms, differing from one another not only in the duration and violence of the symptoms, but also in their relations to various local and constitutional diseases.

2. That in a great proportion of the cases the disease is attended with putrefactive action engaging the necrosed portion of the lung, and affecting its secretions.

3. That in the progress of a case, we may observe the septic action singularly variable. It is increased by over-stimulation of the system.

4. That we cannot explain the symptoms in many cases of this disease, without assuming, either that a spot of mortification, so small as to be undiscoverable by physical means, causes severe symptoms, and is attended with super-secretion; or that a process of putrefactive secretion precedes, in many cases, the death of the lung.

5. That pain of the most extreme kind may attend this disease; and, in the remittent form, appear on each access of the affection with unmitigated violence.

6. That contact with the air is not necessary for the formation of a gangrenous eschar or cavity.

7. That hemoptysis commonly attends each access of the remittent disease.

8. That in the earlier periods of this disease, auscultation and percussion often fail in detecting any signs of organic change; or if such is discovered, it appears incommensurate with the gravity of the symptoms.

9. That in many cases the evidences of congestion and parenchymatous infiltration, seem to follow, rather than precede the symptoms of gangrene.

10. That dexiocardia, from diminished volume of the lung, may occur in gangrene of the right lung.

11. That gangrene may attack a lung previously hepatized from ordinary inflammation, or in a chronic tubercular condition.

12. That from the pre-existence of signs and symptoms of the stages of pneumonia, or from the early appearance of signs of excavation, we may be able to distinguish between fetid abscess of the lung and gangrene.

13. That in certain cases of chronic bronchitis the breath and expectoration may become fetid, and yet no gangrene appear to have formed.

14. That the diseases with which gangrene may be found complicated are divisible into general and local affections; but that its occurrence in the class of general diseases, termed putrid or asthenic, is much more rare than might be expected.

15. That it is rarely observed in the typhus fever of this country, even where the secondary bronchial affection is intense; but that in typhoid pneumonia it may be occasionally observed.

16. That it may complicate a previously existing disease of the lung, such as pulmonary tubercle, or an unresolved hepatization.

17. That it may be directly induced by the pressure of a tumour on the nutrient vessels and nerves of the lung, so that in cases of cancerous or aneurismal tumour, the patient may die, not from the extension of the original disease, but from its inducing a rapid mortification of some portion of the lung.

18. That the disease, though always of a formidable character, is not necessarily fatal. *Dub. Quart. Journal, Feb.* 1850, *p.* 20.

51.—CASE OF MALIGNANT ULCERATION OF THE LARYNX.

By R. H. Meade, Esq., Bradford.

[Mr. Meade's patient was a married lady, fifty-four years of age. The earliest and most prominent symptom in the case was spasmodic difficulty in swallowing, which led Mr. Meade to suspect disease of the œsophagus as the primary affection. No obstruction, however, was felt on the introduction of a bougie. There was also very great pain, deeply seated in the neck, about the level of the cricoid cartilage. Leeching, blistering, and alterative medicines were employed; but the difficulty of deglutition increased, so that for some time before the patient's death, she was quite unable to swallow at all. A few weeks before death a tumour, hard, unyielding, and painful on pressure, appeared on the left side of the neck beneath the sterno-mastoid muscle; and then a similar, but smaller one, appeared in the same situation on the right side. Mr. Meade thus relates the *post mortem* appearances :]

The body was examined forty-eight hours after death.—The integuments having been carefully reflected from the front of the neck, the trachea and œsophagus, with the pharynx and tongue, together with the muscles, vessels, &c. connected with them, were separated from their attachments to the base of the jaw and skull, and the front of the spine, and turned downwards so that the examination might be made from behind. On opening the back of the pharynx and œsophagus, no serious disease was found in these organs. The mucous membrane of the pharynx and back of the tongue was granular, and unhealthy looking, but not thickened nor ulcerated. The œsophagus was rather narrower than usual, but there was no thickening nor induration of its coats. The fatal disease was confined to the larynx, which was extensively ulcerated. A foul, blackish-looking ulcer had completely destroyed the left side of the upper part of the larynx, down to the level of the rima glottidis. The epiglottis was thickened, but not otherwise much altered. The upper part of the left ala of the thyroid cartilage, and its ascending cornu, were completely eaten away with the membranes and ligaments attached to them. The extremity of the greater cornu of the os hyoides was also carious, and partly gone. The true chordæ vocales were entire, but appeared thickened, and the whole mucous membrane of the larynx was granular and unhealthy. There was no deposition of new matter forming any malignant tumor in connexion with either the trachea or

œsophagus (as was previously expected), and the tumors, developed toward the close of life on the sides and front of the neck, were quite distinct from the disease in the throat and larynx. The structure of these tumors was rather peculiar: on reflecting the sterno-mastoid muscle from the front of the tumor on the left side, fluctuation was perceived, and on cutting into the swelling, a small quantity of limpid serum escaped from a cyst in its interior. On continuing the dissection, and examining the tumor carefully, it was found to consist of a fibrous substance, of a very firm consistence, which was full of irregular cells or cavities, communicating with each other; and filled with serous fluid. The divisions between the different cells were cribriform, and hard fibrous bands or cords traversed them in various directions. The tumor seemed to have been formed within the sheath of the great vessels. The descendens noni nerve was traced over its surface, but without being involved in its substance. The internal jugular vein, on the contrary, was completely obliterated for two inches of its course, being converted into a solid fibrous cord. The carotid artery and pneumogastic nerve were unaffected, though the former was closely attached to the tumor. The disease extended from about the middle of the neck quite up to the base of the skull.

The smaller tumor on the right side had exactly the same structure; it was also connected with the sheath of the vessels, but the vein was not obstructed. No disease was found in the lungs.

Remarks. Throughout the whole course of the above case I laboured under an error in diagnosis, thinking that the original and principal seat of the disease was in the œsophagus, and that the larynx was only secondarily affected. The causes which led to this error were, the history of the case, the early symptoms, and the development of the tumors in the sides of the neck towards the end of life. The patient had been subject for many years before she consulted me to spasmodic stricture of the œsophagus, and constant slight difficulty of swallowing; and when I first saw her the pain she complained of was only felt in deglutition. She had then no cough nor difficulty of breathing, nor had she ever been subject to either. I therefore considered that the spasmodic affection had gradually produced thickening of the coats and contraction of the canal of the œsophagus, which disease had ultimately assumed a cancerous form: ulceration had then taken place, which had extended to the larynx and trachea, explaining the symptoms of disease of those organs which subsequently arose; and new matter was deposited round the diseased part, which gradually involved all the surrounding tissues, and towards the termination of the case made its way towards the sides of the neck in the form of hard tumors.

I find other cases related in which disease of the larynx has been mistaken for stricture of the œsophagus. Abercrombie says—"I have seen several cases [of disease of the larynx] in which the dysphagia was the prominent symptom, so as to lead to the supposition of disease of the œsophagus rather than of the trachea. In one of these cases the patient had no constant difficulty of swallowing, but was liable to sudden attacks of it during his meals, which threatened instant suffocation. In another case the dysphagia was permanent, and was combined

with a hoarse husky cough and slight dyspnœa. The whole body of the larynx was much enlarged and thickened; and it was in some degree ulcerated both internally and towards the œsophagus. In both cases the œsophagus was entirely healthy."

As the disease of the larynx gave rise to all the later symptoms in the progress of the disease, it had probably been also the exciting cause of the spasmodic affection of the œsophagus to which the patient had been so long subject; and in that case must have existed (though in a slight form) for many years. In his 'Outlines of Human Pathology,' under diseases of the œsophagus, Mr. Mayo relates an interesting case of spasmodic difficulty of deglutition, which depended upon the irritation caused by ulceration of the interior of the larynx. For the details of this case I must refer to the work itself, not having it at hand.

The next point of interest in this case is the nature of the affection of the larynx. The existence of chronic ulceration in this part has been denied by some authors except in connection with either phthisis or syphilis, but others admit cancerous ulceration of the larynx as a primary affection, though such a disease is certainly rare. No tubercles were detected in the lungs in this case, and no suspicion of a syphilitic taint could be entertained: therefore the ulceration of the larynx must be considered an idiopathic affection, and of a malignant or cancerous nature. No new matter was formed around, or in the diseased textures, as occurs in most forms of cancerous disease in mucous membrane, as, for instance, in cancer of the œsophagus or rectum; but cancer is described as sometimes commencing in mucous membranes by simple hardening, which runs into ulceration. All forms of cancerous disease are remarkable for their tendency to produce secondary affections in other parts; and this leads us to the last point of interest in the case—viz. the nature of the tumors in the neck, and their connection with the disease in the larynx. As I have before stated, no direct communication existed between them. Could they be considered of a cancerous nature? I can find no cases recorded exactly of a similar character, but Müller's description of the form of carcinoma which he calls alveolar bears some resemblance to them. It consists of a tissue of firm white fibres and plates crossing each other in various directions, between which cells are found, from the size of grains of sand to that of large peas, which frequently communicate with each other, and all contain a very viscid, pale, and transparent jelly. The cells in the tumors I have described were much larger than those said to be met with in the alveolar cancer of Müller, and the fluid contained in them was limpid and apparently serous: still, from the rapidity of their development, and their connection with malignant ulceration, they must also, I think, be considered of a malignant nature. In the 'Surgical Anatomy of the Head and Neck,' Allan Burns describes a peculiar sacculated tumor which is sometimes met with in the side of the neck, which has some resemblance in structure to those in question, but it seems to be non-malignant, and connected with the parotid gland. He says—"Sometimes the lower lobe of the parotid gland becomes sacculated, forming a collection of watery viscid fluid. Such a tumor begins just behind the angle of the jaw, and from that nucleus proceeds downwards and laterally. As the

swelling is covered by the fascia it is consequently tense; and although the sides of the cyst be thin and pliant, fluctuation is obscure. This species of tumor does not require to be extirpated, its nature, so long as it is sacculated, is simple: it is a mere body of saliva hollowed out in the glandular substance.—*Med. Gazette, Jan.* 4, 1850, *p.*8.

52.—*On the Treatment of Croup by Calomel and Alum.* By M. Miguel.—In a letter addressed to the Medical Society of Inde-et-Loire, M. Miguel, of Torres, has given some important details of the result of the method of treatment which he employs in diphtheritis.

He relates that, about twelve years ago, a little girl, 7 years old, having been simultaneously seized with angina and croup, he proposed to perform the operation of tracheotomy, which was objected to by the parents. Being thus deprived of the last resource of art, he alternately administered to the child, every hour, two grains of calomel and three grains of alum. This treatment was continued a week, and produced no purgation nor salivation. Since this case, M. Miguel has treated twenty-six cases of croup, only three or four of which were doubtful; and only five cases have been fatal. He attributes the efficacy of his method to the mercury; but as it is liable to produce salivation and other disastrous consequences, these must be prevented; and M. Miguel thinks he has attained this object by combining alum with calomel. He thinks that when the calomel and alum are alternated, the latter serves to circumscribe the mercurial action, which should also be well watched, so that the administration of calomel may be suspended on the least appearance of mercurial intoxication.

Remarks. The treatment of M. Miguel is founded on the property which is attributed to mercury, of diminishing the plasticity of the blood, and opposing the formation of false membranes. The important point is, that this treatment has proved successful in a certain number of cases. It should be known, also, that such treatment will not supersede the necessity of emetics and of energetic cauterization, when the disease has commenced in the pharynx. In such cases, mercury alone is useless: it may be prescribed, but the local treatment is that which must be chiefly depended on, to arrest the progress of the disease. Of this we saw a remarkable instance, a short time ago, in the practice of M. Trousseau.

In this case, the diphtheritis had commenced in the tonsils, and had extended towards the larynx. On the first day of its appearance, an emetic of sulphate of copper was administered, and the back of the throat was well cauterized with fuming hydrochloric acid. This cauterization was repeated once on the next day, twice on the day following, and once on the subsequent day. At the same time, the patient took, in small quantities every quarter or half an hour, a mixture of ten grammes of alum with the same quantity of honey. This is preferable to alum in powder, because the medicine comes into permanent contact with the throat and the arytæno-epiglottic cartilages.

In prescribing alum, M. Trousseau used it as an auxiliary to cau-

terization, not as a corrective to mercury, which he did not give during the whole progress of the case. From the third day, there was a steady improvement; and, on the sixth, the cough had lost its croupy character. The voice continued rather weak, which showed the existence of false membranes on some points. Cauterization was continued once a day, for two days, together with the alum and honey: and the child recovered. This method of treatment is considered, by M. Trousseau, to be the most certain which can be employed in cases of croup.—*(Journal de Méd.)—London Journal, Feb.* 1850, *p.* 186.

53.—ON THE TREATMENT OF HOOPING-COUGH BY THE APPLICATION OF NITRATE OF SILVER TO THE INTERIOR OF THE LARYNX.

By Dr. E. Watson, A. M., Glasgow.

[The unsatisfactory and empirical nature of all the modes of treatment hitherto proposed for hooping-cough, is well known, and depends upon our imperfect knowledge of the essential pathology of the disease. One theory makes bronchial inflammation the first link in the chain of causation; while according to another, the bronchial affection is itself preceded by inflammation of the brain and its membranes. According to some, the essential element of the disease is irritation of the pneumogastric and phrenic nerves; while others, and amongst them the writer of the following paper, states that there is in the first instance inflammation of the respiratory surfaces, followed by irritability of the glottis. In reference to this, Dr. Watson says:]

This last mentioned theory is substantially the one which I adopt, as being simplest, and nearest to the truth. I believe that in a case of uncomplicated hooping-cough the morbid poison first inflames the mucous membrane lining the pharynx and upper part of the larynx; that there the extreme branches of the sensory nerve, the superior laryngeal, become affected in some peculiar way, which I shall not attempt to explain; and that finally the motor nerve, the recurrent laryngeal, is excited into reflex action. Hence the ordinary progress of the symptoms, which first resemble those of a common cold, or slight bronchitis —differing, however, from the latter in the absence of any constitutional or stethoscopic indications of inflamed bronchi, as well as in the periodic character of the cough. Along with this symptom may also be ranked certain peculiar pains of the throat and neck, which are often complained of, and seem to indicate the effect of the poison on the sensory nerves of these parts. Then follows the distinctive symptom of the affection—viz., the hoop, or drawback—which is produced by the excitement of the inferior laryngeal nerve, and consequent spasm of the muscles of the glottis. Such are the symptoms which, in my opinion, are alone essential to the hooping-cough. Few cases of that disease, however, proceed far on their course without the occurrence of another symptom—viz., vomiting—during or towards the end of the paroxysms of coughing; which is doubtless caused by an

extension of the morbid influence to the branches of the pneumogastric supplying the stomach.

Viewing the hooping-cough, then, as essentially an inflammation of the pharyngo-laryngeal mucous membrane, with a peculiar nervous irritability of the glottis, I was naturally led to the opinion, that, if I could reduce either or both of these states, I should mitigate or even cure the disease; and I shall now, in a few words, explain the way by which I came to try, for that purpose, the topical application which I am about to recommend.

Soon after the publication of Dr. Horace Green's work on 'Diseases of the Air-passages', I had several opportunities of putting to the test of experience his method of treating chronic laryngeal affections, viz., by touching the lining of the larynx with a solution of nitrate of silver. My trials fully confirmed his statement of the efficacy of the treatment referred to; and I soon found that I could with advantage carry out a similar practice in many other diseases, such as in ordinary acute bronchitis, in the intervals of asthma, and even with relief of the tickling cough in early phthisis. Having thus established to my satisfaction the efficacy of a topical application of caustic solution, in cases, not only of chronic disease of the larynx, but in all cases of inflammatory irritation of the glottis, I came to the conclusion that it might operate beneficially in the hooping-cough; and, after a pretty extensive trial, I have not been disappointed.

The first case, in which I attempted it, was that of a weakly boy, about eight years old, in whom the disease was already at its height. He had a severe paroxysm of coughing regularly every quarter of an hour; he was already much debilitated, and in constant danger of having some serious lesion produced in his delicate lungs. From the first time that I applied the solution to the glottis, the severity of the cough was mitigated, and after repeating the application every second day for about a week, he was found not to hoop at all. The boy then made a speedy and complete recovery of his ordinary strength under the use of the cod-liver oil.

The sister of this patient was also seriously affected by the same disease, and the application of a solution of caustic was likewise used in her case. But its effects were not so striking as in the other case, owing to the presence of lobular pneumonia of the posterior part of the left lung. Nevertheless, the paroxysms of the hooping-cough diminished in frequency and in violence under its use; and after the pneumonia had been subdued by pretty active measures, the child ultimately made a good recovery.

My third case was that of a boy, about six years of age, in whom the disease had nearly passed without much treatment of any kind having been employed; but he still was harassed with frequent and pretty violent fits of coughing; and when excited or frightened, he still had that mode of drawing in his breath, popularly known as "the drawback." Two or three applications of the solution to the glottis and larynx of this child were sufficient to accomplish a perfect cure of his symptoms; and a short sojourn in the country, with the use of a tonic, completed his restoration to health and vigour.

I have since treated, in a similar manner, several other cases of hooping-cough. The results are equally favourable with those already mentioned. None of my patients continued to hoop more than eight or ten days after the solution of caustic began to be applied to the glottis; and from the first of such applications, the mitigation of the symptoms was very marked. In some cases of children living in the same house with patients affected with hooping cough, and who exhibited symptoms of the commencement of that disease, such as frequent fits of coughing, especially during the night, and when suddenly agitated, with absence of co-existing fever, and of the physical signs of bronchitis, &c., I have, by applying the solution of caustic to their larynges, succeeded in dissipating the symptoms alluded to, and restoring the children to health. I should be sorry to say positively that these symptoms, in all the cases referred to, would, if let alone, have issued in true hooping-cough; but it seems to me *probable* that in most of them they would; and it is certain that they existed in children who had not previously had hooping-cough, who were at the time exposed to its undoubted infection, and in whom the disease did not become formed. I am myself inclined to think that in these cases the disease was checked; but I can hardly expect that the reasoning, by which I have been led to this opinion, can be equally conclusive to others who have not had opportunities of judging of the instances referred to.

I have met with several cases, and have already given an example, in which the violence of the disease had been got over with the ordinary treatment, but the cough still continued. Such children are usually of nervous temperament, and in bad general health, and whenever they cry, a modified hoop is still heard. In all these cases the topical treatment is remarkably efficacious, as well as speedy, in its action, a few applications of the solution sufficing, in most instances, to effect a cure.

While thus stating my confidence in the topical plan of treating the hooping-cough, I ought to mention, that I invariably combine with it due attention to the patient's diet, and proper regulation of the functions of the alimentary canal. I also confine my patients strictly to one apartment, suitably heated and well ventilated, until the stage of hooping has been fairly overcome; and then, if necessary, I recommend change of air and the use of some tonic, generally the cod-liver oil. By pursuing such a mode of treatment, this disease, instead of extending with severity for from two to six months, need not last longer than as many weeks, and with no greater severity than that of a common catarrh.

The ordinary strength of the solution which I have used in the treatment of the hooping-cough, is gr. xv. of the nitrate of silver to an ounce of distilled water; but in some cases I have with advantage increased it to ℈ij. of the salt in the ounce of water. It should be applied every second day; at first to the pharynx only, and, as soon as the parts will bear it, to the glottis and interior of the larynx. In most children the sponge may be passed down to the glottis at the first application, and, at all events, this procedure need not be delayed beyond the next occasion.

The mode of making this application is sufficiently simple. With a

bit of sponge sewed firmly on the end of a whalebone rod, shaped nearly like a male catheter, the operation may, in most cases, be performed with the greatest ease. The patient's head being steadied by an assistant, the tongue is held down by a teaspoon, and the sponge made to glide, on the surface of the epiglottis, down into, and through, the rima glottidis. A very slight and temporary sense of suffocation follows, and the child very soons forgets that anything has been done. The whalebone should be pretty strong, for it is apt to bend in the mouth, and, perhaps, from the tossing of the child, to pass into the œsophagus instead of into the larynx. It is right also to mention, that sometimes a slight amount of pressure is required on the glottis ere the sponge is allowed to pass down. This obviously happens from the valves closing, as in the act of swallowing, before the operator has interposed his sponge, and prevented their coming in contact. The difficulty generally occurs in those cases in which the glottis is placed unusually low in the larynx, and when this is known to be so, the tongue should be pulled well forward, and an opportunity being watched for, when the patient coughs or draws in his breath, by a quick movement of the operator's hand the sponge should be suddenly passed into the larynx.

By thus taking the parts by surprise, he will often accomplish his purpose with ease; though sometimes he will still find the glottis shut against him, and in these cases a little gentle pressure will generally overcome the obstacle. It does require some tact and experience to know what degree of pressure the glottis will bear without injury; but that it will bear a certain amount of pressure with impunity, every one is aware who has tried to any extent this method of treating laryngeal disease. I must remark, however, that I have not found this practice of gentle pressure on the glottis by any means so frequently required in children as in adults. The former generally become frightened, gasp, and cry freely, so that, in them, the aperture is found fully open, and the operator may easily and safely pass his sponge into the larynx.

Some, indeed, not questioning the possibility of applying such solutions to the glottis and larynx, may deny the propriety of their use in the case of organs so irritable, and at the very time in a state, if not of acute inflammation, at least one bordering very closely upon it. But every one admits the advantage of using similar solutions to a no less delicate organ, the eye, when affected with the most acute inflammation; and the results of a few trials will convince any one, that, in irritable and inflammatory states of the larynx, a similar treatment may be pursued with equal safety and success.

[Dr. Hislop, of Govan, has also used this plan of treatment with success. In a letter to Dr. Watson he says:]

The first case in which I have tried the nitrate of silver to the larynx, was a very chronic one, and well calculated to test its efficacy:—A child, three years of age, seized early in the present year with pertussis, and at this time, after a lapse of five months, still liable to a return of the cough on making the least exertion, or receiving any excitement. I continued the application of the solution (ten grains to the half ounce of water) for a succession of mornings,—at first to the back of the throat,

but gradually wearing downwards to the glottis, until I managed, I believe, ultimately to completely insert the sponge. The cough gradually diminished in frequency, and *is now entirely removed.*

In the second case, the patient had only been five weeks affected by the disease, was four years of age, robust, and with considerable mucous râles in the bronchi of both sides. The solution was applied *four times.* A vast diminution in the returns of the cough and the length of the back-draught took place, and the patient *is now rapidly getting quit* of the disease.

In the remaining cases, the improvement that has followed the application of the caustic solution has been equally marked, particularly the diminishing the frequency, severity, and duration of the drawback; and in one of the cases, where the solution was more perseveringly applied, *a complete cure* has been *speedily* effected.

In regard to the difficulties that have been foreshadowed in the way of *applying* the remedy, I conceive they have been much exaggerated, and that it will not be found more difficult than any similar operation on the neighbouring parts.—*Monthly Journal of Medicine, Dec.* 1849, *p.* 1287.

54.—*On the Use of Belladonna in Hooping-Cough.* By M. DEBREYNE.—Belladonna has been eminently useful in the epidemics of hooping-cough, which M. Debreyne has observed; but the success attending its administration depends on the observance of the following rules. The dose of belladonna should be proportioned to the number of months representing the child's age; and the quantity to be taken in twelve days, (the ordinary duration of treatment) will be five centigrammes ($\frac{3}{4}$ of an English grain) multiplied by the number of months. Thus, for an infant six months old, the dose will be thirty centigrammes ($4\frac{1}{2}$ grains) in twelve days; for one of two years and a half, the dose will be $1\frac{1}{2}$ gramme (23 grains) in the same period. For children above six years of age, the quantity of three grammes ($46\frac{1}{3}$ grains) is not exceeded. The medicine is always given three times in the day. For instance, the prescription for a child three years old would be—powder of the root of belladonna, two grammes; to be divided equally into twelve powders, of which one is to be given daily, in three divided doses. If there be vomiting, it should be given immediately after a fit of vomiting and coughing. Recourse should not be had to this remedy, until the inflammatory element has been overcome by leeches, emetics, etc.; in other words, it is not to be employed before the tenth or fifteenth day, when the cough will have assumed its specific character.—*London Journal, April* 1850, *p.* 386.

DISEASES OF THE ORGANS OF DIGESTION.

55.—ON DIGESTION.

By Dr. H. Bence Jones, A.M., F.R.S., Physician to St. George's Hospital.

All vegetable food contains four classes of substances,—first, water; secondly, ashes; thirdly, non-nitrogenous organic substances; fourthly, albuminous organic substances. Milk, as regards the quality of its constituents, is no more the type of food than wheat is. Both contain the same four kinds of substances—the difference is in the quantity of water present. Without quantitative analysis, this is made clear by the fact that we could live without water being added to our milk, but scarcely without its being taken with our bread.

Bread and water together are the type of the food of man, as milk is of the food of the child. Both contain some fleshy, some fatty, some bony, and some watery particles; but the quantity of water naturally present in milk is sufficient to dissolve the other substances present in it when circumstances favour their solution.

The process of digestion has been divided into a process of reduction, a converting process, and a vitalizing process. In my last lecture, I told you that the conversion of a substance belonging to one of the four classes into which food may be divided, into a substance belonging to another class, is neither proved nor probable, so that your idea of digestion may have this separated from it.

The term reduction arose from sugar which contained much water being sometimes called low sugar. Whether the water was chemically combined with the substance or not, was not very clearly expressed. Instead of the term reduction, I shall always use the word solution, which I can more easily understand. Regarding the so-called vitalizing process, I can form no clear idea of it, and so I shall not, by talking about it, enable you to understand what is meant thereby. You will say, then, does the process of digestion mean only a process of solution and nothing more? I think you will see that digestion must not be so limited. Food is dissolved, then it is absorbed, and then it is said to be made into blood, made like to the blood—assimilated is the one complex word at present used. If the solution and absorption are included in the word digestion, we may speak of food as first digested, and then assimilated to the blood. Rarely the term digestion is used when absorption only is meant, the food being dissolved, or being a liquid before it is taken into the stomach. Thus you may read of the digestion of a mineral water, meaning its absorption. In my lecture to-day, I shall attempt to make clear to you more especially the first of these three different processes—1, solution; 2, absorption; 3, assimilation.

The quantity of water present in vegetables is not sufficient to dissolve the nitrogenous and non-nitrogenous organic substances, and the salts which they contain. Even if these three classes were all soluble in water, there is not enough of this fourth class, water, present to hold

the other classes in solution, and thus enable them to pass into the blood. The more soluble a substance is, whether nitrogenous or non-nitrogenous, or saline, the more quickly does it pass into the blood. Some substances,—as sugar, for example,—are readily soluble in water, and water only is requisite to prepare such for absorption. Woody fibre, on the contrary, and green colouring matter, are very insoluble in water and partly from this chemical property, and partly from the mechanical properties, the texture of the woody fibre, it is with difficulty made soluble. Nitrogenous substances, as regards their solubility, differ much in their chemical and mechanical properties. Generally, the more minutely any substance is divided, the more easily will it be dissolved. Division gives surface for the fluids to act on; and the force of cohesion is by the division already overcome.

The first most essential requisite for solution is that some solvent for the food should be present. If the solvent be pure water, then the food must consist of substances soluble in pure water. If the food consists of nitrogenous, non-nitrogenous substances, and salts, then, if these be not soluble in water, the solvent must be some fluid different from pure water. From the best experiments, it is admitted that the solvent in the stomach is an acid liquid. It is shortly named the gastric juice. Before I describe the nature and properties of this solvent gastric juice, I will mention some other points regarding the solution of food. Having obtained a solvent, the second most essential operation is to divide the substance to be dissolved, as finely as possible. That food which is most capable of being finely divided, will for the most part be most easily dissolved. Herein the advantage chiefly consists of tender meat over tough; of stale bread over new; of yolk over the white of a boiled egg; of fish over flesh. The third essential point is, that an excess of the substance to be dissolved should not be taken. A given quantity of water cannot dissolve an unlimited quantity of even sugar or salt. A given quantity of dilute acid cannot dissolve an unlimited quantity of albumen; and any given quantity of the gastric juice cannot dissolve an unlimited quantity of food. Moreover if too much non-nitrogenized food is dissolved, the excess must be deposited as fat, or thrown out by the excretions; and if too much albuminous food is taken, it must accumulate in the blood, or be thrown out of the blood; and fat and plethora are not the only evils too much food causes. If an excess is taken into the stomach, the irritation causes the greatest possible secretion of gastric juice. If too little gastric juice is poured out, a portion of the food will remain undissolved, and sickness or disorder of the bowels will result. If too much gastric juice is poured out, heartburn, pain in the stomach, and flatulence, are produced. Excessive irritation of the stomach, and its never-failing consequence, excessive acidity, may be produced not only by too much food, but by certain kinds of food. The error may be as great in the quality as in the quantity of food. The bulb of a thermometer, a probang, and metallic balls, have been used to excite the secretion of acid in the stomach; and hard, solid food, or highly stimulated pepper, frequently causes excessive irritation of the stomach, and excessive acidity and flatulence, and increased muscular action, sometimes as spasmodic and painful as any cramp in the extremi-

ties. These effects depend much on the quality as well as on the quantity of food. The mechanical properties of the food, even more than their chemical ones, are concerned in causing this irritation; but dilute sulphuric acid, vinegar, or sugar even, which can become acid, will cause as much pain as the toughest meat, or the hardest potatoe.

You see, then, why unirritating food, in the finest state of division, and in moderate quantity, can prevent and cure that form of indigestion which depends on an over-irritable state of the mucous membrane of the stomach.

I must return now to the nature of the gastric juice, and to its action on the different classes of substances of which our food consists.

On the Nature of the Gastric Juice and the Changes it Effects on Nitrogenized and Unnitrogenized Food.—On the 5th of March, 1849, breakfast having been taken at eight A.M., on boiled beef, bread, and spring water, at 9.45, by position and voluntary effort, about a pint of substance was ejected. The first ounces were scarcely acid to the taste; the last portion was most intensely acid. The whole quantity was thrown on a filter, and a clear, yellowish-brown liquid passed through. This clear liquid was intensely acid to test paper. It coagulated slightly on the addition of nitric acid and heat. The cold acid caused a deepish yellow colour and a coagulum, which appeared partly to be soluble by heat and precipitable by cooling. The specific gravity = 1008.2. 504.1 grains, evaporated in vacuo over sulphuric acid, evolved a small quantity of gas.

Residue + basin ... ... = 549.3 grains.
basin ... ... = 505.0 „

March 15th.—Residue ... = 44.3 grs. = 8.8 per cent.

The residue was yellowish, semi-transparent, took the impression of the nail, smelt of musk and sugar?! When mixed with cold distilled water it became ropy and very adhesive. The solution was highly acid. The taste was sweet, acid, bitter, nauseous. A few drops of the solution with sulphate of copper and liquor potassæ, gave an intense blue, with a trace of purple; and the reduction of the oxide of copper was very rapid, excessive, and red.

In this bottle you see this gastric juice. Here is its strong acid reaction on litmus, and here you see the rapid reduction of the oxide of copper. The food being bread, it is probable that some of the sugar was formed in the process of fermentation, and not produced altogether in the stomach.

This gastric juice, then, is a highly acid fluid secreted by the stomach. It consists—1, of water and free acid; 2, of salts; 3, of non-nitrogenous organic substances; 4, of albuminous or nitrogenized substance. Of these substances the most important is the free acid. What acid it is has not yet been determined. Hydrochloric, phosphoric, acetic, lactic, and butyric acids, have each been said to exist in the gastric juice. The hydrochloric and phosphoric are mineral or inorganic acids. The rest are organic acids,—possibly arising from starch, sugar, or fat, or other components of the non-nitrogenized part of our food. Thus these organic acids might be formed; but whence can the inorganic acids come? Hydro-

chloric and phosphoric acids exist only in the food and blood, combined with soda, potash, or lime; as in common salt, phosphate of soda, or phosphate of lime. To set free the acids, the alkalies must be separated. If one equivalent of hydrochloric acid is set free in the stomach, one equivalent of soda must be set free in the blood. The greater the quantity of acid in the stomach the greater the quantity of alkali in the blood, and the more alkaline the serum must become. Whether this is effected by galvanic action, nervous action, or muscular action, is at present altogether unknown. Those who say anything say it is by vital action. Whatever may be the nature or seat of the decomposing force,—whether galvanic, nervous, or muscular,—whether in the cells of the epithelium of the stomach-tubes, or in the muscular structure,—we cannot admit that inorganic acid can be poured into the stomach without an equivalent quantity of alkali being set free in the blood. When digestion is completed, the acid is re-absorbed with the food, and the alkalescence of the blood must be altered in the opposite direction. When the stomach is empty, there is little if any acid there then. When food is taken, the quantity of acid begins to increase, and gradually reaches the greatest amount poured out; and then by absorption, or by escape through the pylorus, the quantity of acid begins to decrease, until the stomach is again empty.

For the purpose of keeping up a constant supply of at least one inorganic acid, man has been led at all times; and in all circumstances, to seek for salt as necessary to his existence. What the influence of chloride of sodium undecomposed, and of other salts, is on the solubility of albumen or starch, has not yet been sufficiently determined.

The next most important constituent of the gastric juice, after water and acid, is the albuminous substance. Its exact nature is not known. I cannot consider it as epithelium. It is far more likely to be a substance like diastase; not albumen, not epithelium, but a peculiar albuminous substance. Its exact composition is not known; but probably it is a substance undergoing changes which it can communicate to other contiguous substances. It was precipitated by weak alcohol from infusion of pig's stomach, by Wasman, and he called it pepsin; it requires re-examination.

The non-albuminous organic substances in the gastric juice are the organic acids and fatty substance; the latter probably exists in a very small quantity. This complex gastric juice cannot act precisely in the same way on two classes of substances so very different as nitrogenized and non-nitrogenized food.

Firstly. *The action of the gastric juice on the nitrogenized substances in the food.*—The fine state of division of the food, the smallness of its amount, the constant muscular motion of the stomach, and the temperature of the body —these all assist the solution of fibrin, albumen, or casein. Strong acids very easily dissolve these albuminous substances, and the dilute acid of the stomach, in consequence, perhaps, of some influence of the nitrogenized pepsin, or animal diastase (?), is made to act as energetically on the albuminous food as strong acid would do. In this action there is nothing vital; it takes place as well out of the body as in it. The elements of the albumen cannot be converted so as

to form water, salt, sugar, or fat. There is no formation of incipient albumen. If you please to call solution, reduction or combination of water with the substance dissolved, you may say the albumen is reduced; to me it is far more simple and quite as comprehensible to speak of it as a process of solution, and as nothing else.

Secondly. *On the action of the gastric juice on non-nitrogenized food, starch, sugar, fat, &c.*—Starch is perfectly insoluble in water and in dilute acids, but by the action of dilute acid it easily undergoes a change, by which it is rendered soluble. The action of strong sulphuric acid on starch, and the formation of sugar thereby, is probably well known to you already; but there is no strong acid in the stomach.

The relation of starch to British gum, or dextrine, or, as it has been called, soluble starch, is also well known to you. There are many ways of changing the insoluble starch into soluble dextrine. One very perfect method has been practised in France, of treating the starch, at the temperature of 100° Fahr., with dilute hydrochloric or oxalic acid, and thus dextrine is readily formed. There is no doubt that the temperature and dilute hydrochloric acid in the stomach effect the same conversion as you see has been effected in this flask; further action of the acid and heat converts the dextrine into sugar. It has been said, that the starch is acted on by the alkaline saliva, but directly the saliva reaches the stomach, it must be neutralized by the gastric juice.

On the action of gastric juice on sugar.—The ready solubility of sugar in water requires no illustration. A portion of the sugar which is taken as such, or is formed from starch in the stomach, without doubt passes into the blood as sugar; but it appears to me highly probable, from Fremy's experiments, that a portion is changed into some of the vegetable acids. The acetic and lactic acids may thus be formed, and these, in part, perhaps may become lactates and acetates of soda in the blood. And we know, from direct experiment, what happens to vegetable acid salts injected into the blood, or taken into the stomach; they are oxydized or burnt, giving heat and carbonic acid salts, which pass off in the urine. All free vegetable acids are probably changed partly into carbonic acid in the blood. Thus, then, probably the progress of a grain of starch may be traced. It forms, first, dextrine; secondly, sugar; thirdly, vegetable acid; fourthly, carbonic acid.

The ascending conversion of sugar into albumen cannot be admitted until it is proved. There is not an experiment which renders such a change probable.

The descending conversion of sugar into fat, a substance also containing no nitrogen,—that is, of one kind of non-nitrogenized substance into another kind belonging to the same class,—is most fully proved. Bees fed on crystallized sugar made wax, and animals form more fat than the food they are fed with contains; but this fat is not formed in the stomach, and therefore does not concern us now. The changes take place in the minute textures of the body, and not in the stomach.

On the action of the gastric juice on fat and oil.—How is fat made soluble at the temperature of the body? Is oil absorbed? The following is an experiment by Tiedemann and Gmelin. A dog was fed for four days on butter; three hours after the last meal he was killed.

a. Stomach contained butter, and the contents were very acid. *b*. Small intestine contained butter and bile, and was acid strongly. *c*. The cœcum contained butter. *d*. The rectum contained butter. *e*. The chyle was very milky, and cleared with ether. *f*. The blood of the vena cava inferior contained much fat. *g*. The urine was thick; filtered, butter soluble in alcohol was left on the filter. They add: "One of our pupils who likes fat, has frequently found it in his urine." This has also sometimes been observed after cod-liver oil. Oil and albumen form an emulsion slightly soluble in water; but the pancreatic fluid and the bile are generally considered as the agents which made the fat and oil of the food soluble.

Lastly, the phosphates and sulphates of soda, chloride of sodium, are soluble in water. The earthy phosphates are dissolved by the hydrochloric acid. Even silica, in minute quantity, is contained, dissolved in water, and hence these salts pass into the blood.

I may sum up the conclusions of this and of my former lecture thus. Each meal may be separated into these four classes of constituents—albuminous substances; non-nitrogeneous organic substances, as starch, sugar, alcohol, fat; salts; water. Digestion of any meal is the solution in the stomach of these different substances, and their absorption from the bowels.

The formation of the gastric juice is certainly no chemical process, but its action is entirely chemical, though it is aided by the motion which the muscular coat of the stomach produces; and muscular contraction is as distinct as sensation from chemical action. Nor can the absorption of the dissolved substances be altogether considered as a vital action. It is certainly subject to the laws of the diffusion of one liquid into another, to the laws of endosmosis, or diffusion through a membrane, and to capillary action.—*Lancet, Jan.* 19, 1850, *p.* 69.

56.—ON THE ACTION OF SUGAR, COFFEE, ALCOHOL, AND WINE ON THE ANIMAL ECONOMY.

By Dr. Bocker.

[Dr. Bocker, we are told, divides aliments into two orders;—1. *True aliments*, which comprise most azotized substances, and which are truly nutritive; and, 2. *False aliments*, or non-azotized substances, which may keep up life for a time, but which do not really repair the tissues. In the latter division are included the substances spoken of in the following remarks:—]

Sugar.—Several healthy persons, among whom was the author, subjected themselves to a sugar diet. The experiment was conducted with great care; accurate analysis of all the excretions were made before, during, and after the use of sugar, so as to ascertain with exactitude the influence of that substance on the constitution, and on the egesta of the organism. It was found,—1st. That sugar diminishes the exhalation of

carbonic acid from the lungs. In the normal state the mean of the acid exhaled was 19 cubic inches in a minute, with the sugar it fell to 18. The amount of water contained in the expired air fell likewise by the use of sugar, the difference between the sugar diet and the use of bread and meat being, within twenty-four hours, about five drachms of water less in the former case. The cutaneous secretion did in the meantime not increase. 2nd. The sugar diet was found to diminish considerably in the quantity of animal extractive matter and phosphates in the urine. These results are quite in accordance with those obtained by Chevreul and Magendie, which go to prove that the phosphates disappear from the urine of dogs exclusively fed upon sugar. It has been maintained by some authors that sugar was decomposed within the body, and produced lactic acid, which, acting on the phosphate of lime of the bones, rendered that salt soluble, and caused its elimination from the economy. This supposition must give way before Dr. Bocker's experiments, since they prove the very reverse to be the case—namely, that phosphates are eliminated in very small quantity, and may even be entirely absent from the urine when the sugar diet is used. Sugar, therefore, may be looked upon as finally diminishing the amount of excrementitious detritus which is produced by the phenomena of nutrition. This fact will be apparent when it is considered that during nutrition a continual composition and decomposition of the tissues of organs are taking place. The elements of repair are taken from the food and blood, whilst the worn-out particles are eliminated by the lungs and the kidneys, in the form of water, carbonic acid, urea, extractive animal matter, phosphates, &c., &c. The intensity of these changes is represented by the quantity of excreted material. When the amount of the latter is diminished, a retardation in the phenomena of nutrition may be inferred, and this retardation is one of the effects of the sugar diet. Hence sugar, which cannot be considered as an element of nutrition, may nevertheless concur in the maintenance of life. Its action differs from that of a really nutritious substance in this respect, that the latter furnishes elements which promote the nutritive or destructive activity of organic tissues, whilst the saccharine substance does not yield anything to the organs, but moderates their nutritive phenomena, producing an economy in the quantity of the materials of repair employed, and, consequently, a diminution in the excretory products, resulting from the waste of the tissues. These views, which, at first sight, seem exclusively of a physiological nature, will easily bear a therapeutical application. The physiological action of sugar may indeed become of great therapeutical value, in certain pathological states. The author considers scrofula as depending on two causes; first, on insufficient food, and unfavourable hygienic circumstances, capable of bringing on deficient nutrition; second, on a hyper-activity in the nutritive and destructive changes of organs, which may bring on a wasting of the individual. If the disease depend on the first cause, the measures to be employed are obvious—abundance of food, and better hygienic arrangements; if it depend on the second cause, (a circumstance which may be ascertained by noticing the larger proportion of excretory products,) the disease should be combated by an agent capable of diminishing this too great activity. This agent is no

other than sugar; and the author quotes several cases of scrofula, belonging to the second of the two categories mentioned above, which were finally cured by mixing a large proportion of sugar with the patient's usual food. Malacosteon may also be referred to two causes; first, the food of the individual may contain an insufficiency of earthy salts; (the fact of dogs and chickens becoming rickety, when fed upon substances containing no phosphate of lime, is well known); or, secondly, the phosphates which are to repair the skeleton are too rapidly eliminated. In both cases, earthy phosphates should be added to the patient's food, but if too rapid an elimination of these phosphates exist, it should be checked, and this will be easily effected by adding a large proportion of sugar to the food. The author has treated a great many cases of this kind with great success, by giving powders of calcined bone mixed with sugar. When a child at the breast is affected with this disease, owing to the poverty of the milk, the mother should take the calcined bones, but without the sugar, in order that the elimination of the phosphates through the milk may not be interfered with. It may, in such cases, be ascertained that the milk contains a larger quantity of phosphates than usual. In one of the cases cited, the child was affected by craniomalacia, and the mother's milk was found to contain ten times less phosphate of lime than ordinary human milk. This secretion was much improved by the administration of the bone powder for a protracted period, and the child got rid of the softening of the brain box. It has likewise been discovered, by repeated examinations of human milk, or that of animals, that the sugar contained in it is always in an inverse ratio with the azotized matter—namely, casein.

Coffee.—This substance acts upon the nervous system in an especial manner, which fact the author ascertained by experiments upon himself. The symptoms produced by large doses were a diminution of appetite, slow digestion, and an uneasiness of respiration simulating asthma. The number of inspirations and the amount of carbonic acid and water exhaled were likewise diminished. The blood in the veins had a darker tint, and the globules did not redden easily by the contact of the air. As to the urinary secretion, it was found that the phosphates were as abundant as usual, whilst the urea, uric acid, and other organic matters, were considerably diminished. The author concludes that coffee presents the characters of a false aliment, as it diminishes the destructive metamorphosis of the organs, and may be employed in diseases where this metamorphosis is too active. But coffee has likewise the property, when taken in a sufficient dose, to excite the nervous system, and may therefore be looked upon as the incentive of the rich, and the consolation of the poor. It is a comfort to the poor, since it appeases hunger, and renders an indifferent meal more substantial; and it excites the rich by its action on the nervous system.

Alcohol.—By the use of alcohol, the carbonic acid exhaled by the lungs was diminished. Alcohol acts, moreover, in an especial manner, on the brain, and on the circulation, which latter is rendered slower by its use. But alcohol acts, finally, like sugar and coffee, since it likewise retards the destructive metamorphosis of organs. So that alcohol, looked upon as an aliment, supports the economy without nourishing,

when taken in certain doses, and not acting on the brain; because it prevents the wasting of organs to go on so fast as usual. As a therapeutical agent, alcohol has been observed to increase the density of the liver with people who use it habitually.

Wine.—The experiments were made with white Rhenish and with red wine. The results were not similar in both cases. By the use of the white wine the urinary secretion, the watery exhalation from the lungs, the carbonic acid given off by the same organs, and the solid portions of the urine, were augmented. Thus it will be seen that the Rhenish white wine increased the nutritive activity instead of moderating it. Red wine, and Bordeaux in particular, produced a contrary effect; the urea and solid matters of the urine were diminished, and certain solid matters yielded by the wine were found in the urine. There was likewise a diminution in the respiratory movements and the amount of carbonic acid and water given off by the lungs. Red wine, therefore, by supporting the strength of the system, acts like the other false aliments.

By the foregoing considerations, then, it will be seen that nutrition, considered as a continual destruction and renewal of organs, may be effected in two different manners. The first, by furnishing a sufficiency of material for this organic renovation; the second, by delaying or diminishing the organic destruction, which constantly requires repairing materials. The first end is attained by the *true aliments*, the second may, according to the author, be accomplished by the *false aliments.*—*Lancet, Jan.* 26, 1850, *p.* 119.

57.—*On the Treatment of Nervous Gastro-Intestinal Affections by Charcoal.* By Dr. Belloc.—The Academy of Medicine of Paris, to whom a memoir was presented on this subject by Dr. Belloc, have just published a report very favourable to the author. From this document we gather, that poplar-wood, prepared in the manner pointed out by Dr. Belloc, is the most efficacious. The powdered charcoal is to be taken in doses of one or two tea-spoonfuls before meals; a pleasant feeling about the epigastrium and some appetite are excited by it, and if taken after a meal it renders digestion more active and rapid. This inert powder seems neither to be digested nor absorbed: it merely passes through the digestive canal, and takes hold of the gases and liquids hurtful to the economy. The charcoal powder keeps the bowels open with those patients where gastralgia is complicated by constipation, and its effect is not confined to rendering digestion better, but it likewise allows of more tonic and abundant food being used, whilst it renders the stomach more fit to bear such active remedies as were but ill borne before. The powder may be given in the form of pills or lozenges, but Dr. Belloc prefers administering it in cold water, in the shape of a moist paste, of which a tea-spoonful is swallowed, half a glass of water being drunk upon it. Some patients, in the hospitals where members of the committee prescribed the powder, found the charcoal very repulsive in that form, and the physicians were obliged to give it wrapped in bread. The doses vary from two to six spoonfuls per diem, according to the severity of the disease: this dose, however, may gradually be

increased, as Dr. Belloc has himself taken sixteen ounces in one day. Very chronic gastro-intestinal affections are modified in a few days by the use of the charcoal. Several cases of a very satisfactory character are appended to the report, and we decidedly think that trials ought to be made in this country, where gastric affections are so frequent.—*Lancet, April* 27, 1850, *p.* 504.

58.—*On a Peculiar Affection of the Intestinal Mucous Membrane, and on its Treatment by Electro-Galvanism.* By Dr. W. CUMMING, Secretary of the Edinburgh Obstetrical Society.—[Dr. Cumming gives a detailed account of a disease, which, he says, is not described in systematic works, but which is nevertheless very common, and is productive of serious discomfort to the patient. Dr. C. says:]

We are often consulted by patients who, at the first glance, convey the impression that they are imperfectly nourished: they have an emaciated appearance. In detailing their symptoms, they lay great stress on a feeling of emptiness, or rather faintness, at the epigastrium: they complain of exhaustion there. They generally next direct our attention to a more or less fixed pain, either in the left hypochondriac or iliac region, sometimes both, more frequently the latter,—a pain from which they are rarely exempt, and which is sometimes very severe and acute, though oftener gnawing and irritating. If they have ever been induced to apply a mustard blister to the seat of pain, they dwell on the relief, great, though temporary, they have experienced from it. The stomach, in most of the cases I have seen, has not been irritable: it commonly retains and digests the food; but pain is frequently felt in the course of the colon, in a period varying from an hour to two hours thereafter. The bowels are at one time constipated, at another lax, in the same person. Some are uniformly costive, others more frequently loose; but in all *(and this is the characteristic mark of the disease)* a peculiar membranous, fibrinous matter is discharged. In some cases it is stringy, in others tape-like in its form; in others, again, in small masses, resembling fat; while in the milder cases it is more diffluent and gelatinous. That the disease has, from want of proper examination of the intestinal evacuations, frequently eluded observation, I know too well from my own experience, and that it has consequently been maltreated does not admit of doubt. The last thing the patient will mention (if, indeed, he mention it all) is the characteristic discharge. When the doctor directs his or her attention to it, they will hesitatingly admit that they may *possibly* have remarked it—nay, even when they are informed that scarcely a stool passes without more or less of it, they will often fail to discover it; and hence no practitioner should rest satisfied when he has reason, from other indications, to suspect the affection, till he has himself examined the fæces most carefully, particularly when separating the fluid from the solid matter. In the former he will rarely fail to discover flakes or streaks, or even small masses: these, if discovered, will lead, at future opportunities, to the detection of larger and more unmistakeable portions of the abnormal secretion. To take the report of the appear-

ances from the patient is, in too many instances, the surest way to deceive both you and himself. In addition to this, there is not unfrequently a considerable discharge of blood from the bowels, and that, too, where no hæmorrhoids can be detected. Almost uniformly there is great pain during evacuation, and always a feeling of exhaustion for some time after. In most of the patients there is a peculiar expression of countenance, so striking that one who has seen many such cases can, with tolerable certainty, tell, without more minute examination, what the nature of the complaint is. It is an expression of anxiety: quite different, however, from that which usually marks organic disease. You do not conclude, as is too often the case with the latter, that your patient is labouring under an incurable malady.

Scarcely less characteristic of the disease than any of the preceding symptoms is the state of the mind. In all there is more or less nervousness, greatly increased towards night, inducing sleeplessness; and when, towards morning, sleep does come on, nightmare is frequent—dreams (generally of an unpleasant nature) invariable. One lady was troubled with spectral illusions. Prof. Simpson has informed me that he has remarked, in most of the cases that have come under his observation, a deficiency of memory in regard to words; the patient knows what he wishes to express, but cannot find the expression at the moment. In my own experience I have not observed this so frequently, and certainly in very many cases it is wanting.

When the affection has been of long duration (and too frequently this is the case before we are consulted) the mental irritability is very great; and what is more painful still, the patient's feelings and views are perverted and distorted. It is unnecessary to add that they are miserable in themselves: and, where the nature of the affection is unknown to and due allowance not made by their companions and friends, the cause of misery to others. They are quite sensible that they are not what they formerly were—that they are changed for the worse: they feel, moreover, that they have little control over their mental state, and are apt to fall into a condition of great depression and despondency. If I were to express their internal feeling in few words, I would say that they have a mixture of irritability and despondency, relieved from time to time by happier feelings, but those of comparatively short duration.

In endeavouring to trace the history of the disease in each individual case, we are generally told by the patients that they cannot indicate the precise time when their symptoms arose. Not unfrequently they ascribe their origin to drastic medicine; and I believe that the pernicious habit (now, happily, not so common as formerly) of taking aperient medicine in one form or another, is by far the most frequent cause; but it is certainly not the only one. It is vastly more common in the female than in the male sex, though by no means uncommon in the latter; and in the former it is very often accompanied by dysmenorrhœa, and occasionally by the membranous form of that affection.

1. The primary, and, I believe, indispensable point is total, or almost total, abstinence from aperient medicine. With this view, I was till lately in the habit of relieving the bowels every third or fourth day by enemata of simple warm water, or with the addition of a table-spoonful

of oil, and perhaps every ten or twelve days a dose of castor oil by the mouth. These means, simple though they be, do mischief; and, therefore, it was desirable to discover a mode of effecting the object without the disadvantage of its being at the same time an irritant.

2. External counter-irritation. This, in the form of a mustard blister every night or second night, gave considerable but temporary relief, and was always most grateful to the patient; but in very many instances it failed utterly, and, where it did benefit, the relief was transient.

Circumstances, which I need not at present detail, led me to surmise that electro-galvanism would accomplish both these indications of treatment without the disadvantages with which the other means were chargable; and the results of its use in a considerable number of cases of this disease, warrant me, I think, in affirming that it is competent of itself to the cure of almost every case, and that, aided by an internal medicine which I shall refer to presently, it will cure both certainly and speedily. In the first place, it acts as an aperient,—seemingly by its action on the muscular coat, as well as the mucous membrane of the bowels. *In every case* in which I have used it this has been the effect; and if it had no other consequence than this, the advantage would be prodigious; for as in a multitude of instances the disease has been traced to the use or abuse of laxative medicines as a cause, and as during the treatment even the mildest aperients irritate the membrane, and so far aggravate (temporarily) the disease, the evacuation of the bowels, by any means that do not irritate, is obviously of great consequence. But the electro-galvanism does more than this; for 2ndly, it induces such a state of the bowel as prevents the formation of the peculiar secretion: that is, it restores it to a more healthy condition. I purposely avoid using expressions which might involve a theory as to its mode of action, and do not profess to tell how this result takes place: the fact itself is indubitable. 3rdly, it supersedes counter-irritation. The pain in the side, for the removal of which the counter-irritant was employed, is relieved by an application of the galvanism for at least twenty-four hours; in many cases for a much longer period; but as the agent is applied once a day, where no contra-indicating cause exists, till the disease is removed, the pain may be said to be abolished.

Galvanism, therefore, might of itself effect a cure; but I have generally combined it with the internal exhibition of tar, and have thus effected cures in a much shorter time than by either of these means singly. For some time I was in the habit of giving internally the nitrate of silver, arsenic, or cod-liver oil, as circumstances directed; but latterly I have confined myself to the administration of tar, suggested first, I believe, by Dr. Simpson, and have found it of all internal means by far the most effectual. It relieves the feeling of exhaustion at the epigastrium, imparts an agreeable warmth, and promotes appetite and digestion; but by itself it is long in effecting a cure, even in slight cases, in all the trials I have made of it. The plan I have hitherto adopted has been, to give the tar, in the form of pill or capsule, thrice a day; the electro-galvanism (Kemp's, of Edinburgh, machine, is the one I have used), is applied for a quarter of an hour daily, the intensity being

increased from time to time. Steady perseverance is requisite. With this the case must be obdurate indeed that will resist a cure.

One remarkable fact connected with the treatment of galvanism is, that it *determines* the portions of the bowels where the greatest amount of irritation exists—a knowledge which manual pressure fails to convey: for it is a singular truth, that when the instrument is in action, extreme tenderness is complained of in more than one well-defined spot or tract, of which the patients were not previously aware, and quite distinct from the regions to which the attention of the doctor is directed as the seat of pain. And it is extremely interesting to observe how this tenderness after a time, and the continued use of galvanism, diminishes till a mere point is fixed on as its seat, and how this also is removed; after which the disease may be said to be extinguished, though I have seen reason to persevere at more distant intervals in the application of the agent, for the sake of confirming the recovery, strengthening the nervous system, and conducing to the self-regulation of the bowels.—*Med. Gazette, Dec.* 7, 1849, *p.* 969.

59.—*Use of Turpentine in Flatulent Distension of the Abdomen.* By Dr. T. Smith, Cheltenham.—This is a distressing symptom, which often accompanies a dyspeptic state of the system, especially in gouty patients. It is sometimes attended with nervous excitement of the heart, sometimes accompanied by spasm of the bowels, and dyspnœa. For the relief of this symptom, whether originating from mal-assimilation of the food, or supervening on obstruction of the bowels, or occurring after an operation for strangulated hernia, I have found no medicine so efficacious in quickly dispelling the flatus, as oil of turpentine. In gouty subjects, who freely secrete lithic acid, and who are much troubled with this kind of flatulency, I have rarely ever experienced that small doses of the oil of turpentine, with or without colchicum, have failed to afford very great relief, more particularly when accompanied by a mild diuretic course of Cheltenham salines. It is of the greatest importance to avoid active purgation in this state of the system.—*London Journal, April* 1850, *p.* 343.

60.—*On the Best Means of Obtaining the Purgative Operation of Calomel.* By Dr. J. C. Hall.—[For the purpose of obtaining the best purgative effect of calomel, Dr. Hall recommends it to be mixed with a little table salt, and placed dry upon the tongue; no other purgative being combined with it, and the patient abstaining for some time from taking water or other fluids. Dr. Hall observes]

This is a point of practical importance, and well worthy the attention of the practising surgeon and physician. It is a well known fact that the inhabitants of maritime localities, and sailors, after a long voyage, in which they have been deprived of the use of fresh provisions, and kept upon salt meat, are more liable than others not so circumstanced

to the influence of mercurial preparations; which arises, in the opinion of Mialhe, from the bodies of such men containing large quantities of the alkaline chlorides,—so that there is more complete conversion of calomel into corrosive sublimate than under the usual state of the body. Children, and patients confined to a milk diet, support large doses of calomel, because the fluids in their alimentary canals are destitute, or contain only very small quantities, of the alkaline chlorides. Patients, also, who have lived for a long time on broth, or low diet, the fluids of whose bodies are also exhausted of chlorides, consequently bear large doses of calomel without the system becoming affected.

To Dr. Mialhe we owe, also, the explanation why calomel acts best as a purgative when put dry upon the tongue, with the addition of a few grains of salt: he says, "that the action of insoluble remedies must be inversely to the quantity of water administered with them; and this he has proved by actual experiment. For example, if nine grains of calomel, nine grains of table salt, and the same quantity of muriate of ammonia, are put into seventy drops of water, there will be produced, in twenty-four hours, one-third of a grain of the bichloride of mercury. Place the same ingredients in a vessel, and add to them one hundred and forty drops of water, twice the quantity—and the result will be one-quarter of a grain of corrosive sublimate; but if we add to the same substances four times the quantity of water, one-sixth of a grain of corrosive sublimate only will be formed: "hence," writes Dr. Mialhe, "it is clear the purgative effects of calomel are lessened by taking a large draught of water immediately afterwards." The whole subject of the administration of medicines is fraught with much interest, and is one well worthy the attention of the medical profession in this country.—*Med. Gazette, Feb.* 22, 1850, *p.* 320.

61.—*On the Use of Iodide of Potassium in Sympathetic Vomiting.* By Dr. A. C. Selkirk, Carluke.—Ricord, in speaking of the properties of this salt, particularly as it influences the symptoms and characteristic phenomena of tertiary accidents, remarks that large doses seldom or never cause vomiting. I am of opinion, from a considerable experience in the use of the salt, that it is one of the most powerful agents we possess of allaying the irritability of the stomach; and what seems of more practical value, the property the salt exhibits, in combination with infusion of quassia, of allaying the sympathetic irritability of that viscus, consequent on some distant local irritation—for example, in the constitutional irritation manifested in lumbar or gluteal abscesses. At the period of writing these notes, I have a case of gluteal abscess under treatment, which illustrates the practical interest of the remarks submitted. Local depletion, counteraction with usual remedies, failed to produce resolution; pus formed deep under the gluteal muscles, and was discharged by puncture. The constitutional disturbance at this period was not great, albeit the disease had existed for six months. The general irritation, however, became violent after the abscess had been discharging for six weeks, the stomach rejecting all the ingesta, both solids and fluids. Opium, small doses of castor oil, with the neutral

salts, quinine, &c., were had recourse to, without the slightest mitigation in the symptoms; the patient lost flesh rapidly. Pulse 110, weak; he was evidently fast passing into an extreme anæmic condition. At this juncture he was ordered iodide of potass, two drachms; infusion of quassia, two pounds. To take half a wineglassful three times daily. The vomiting and irritability of stomach ceased after the third dose, the secretions of the alimentary canal improved, and the patient, from that period, rather gained ground. He is clearly, however, of the strumous diathesis, and although the abscess has no connexion with hip-joint nor psoas muscles; still, from its extent, dissecting deep under the gluteal muscles, and the great amount of constitutional disturbance set up, the prognosis is unfavourable. I have used the iodide in several cases of the above-mentioned description, with similar results. I am not aware of this property of the salt having been previously adverted to.—*Lancet, Dec.* 15, 1849, *p.* 636.

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62. —*Cases of Tape-Worm Treated by "Kousso," a New Remedy.*—[The "Kousso," or Brayera Anthelmintica, (a plant of the natural order Rosaceæ,) was introduced into notice by a pharmacien of Paris, and its properties as an anthelmintic were investigated by the Academy of Medicine so long ago as 1847. The report of the above-named body, as also of the Academy of Sciences, was extremely favourable. The remedy has not yet been given in this country, so far as is known, except in the cases detailed below, which were treated by Dr. BUDD, at King's College Hospital. We are told that]

The parts of the plants used are the flowers, which, being reduced to a fine powder are macerated in lukewarm water for fifteen minutes. The infusion, with the powder suspended in it, is taken either in one, two, or three doses, quickly following each other. It is recommended that lemon-juice should be taken freely before and after the kousso. The patient must be prepared by low diet for a day previously, and the medicine taken on an empty stomach before breakfast. The clear infusion has the colour, and a somewhat similar taste, to very weak senna tea. It rarely causes any annoyance or uneasiness, except a slight nausea, and this but seldom.

The first woman to whom the kousso was given had generally enjoyed good health. From her account, it is probable that she had not been troubled with tapeworm previous to her coming to London, a year and a half ago, during which time she had resided in Tooley-street, Borough. When the first symptoms of it came on twelve months since, she took oil of turpentine and castor oil, under the use of which a large portion of tænia passed. She had at first a ravenous appetite, which passed away, leaving a constant feeling of flatulency in the stomach. Langour, general debility, incapacity for work, and nausea, were her chief symptoms. During the four months preceding her admission, she was constantly taking various remedies, such as turpentine, &c., under the direction of her medical attendant; but with none of them was the worm passed.

When admitted into the hospital, she was ordered half a drachm of jalap and low diet, and subsequently other purges, but without bringing away any joints of the worm for four days, when the kousso was administered on an empty stomach, which in the course of the day brought away a large worm. Its head could not be detected, but the narrow portions which seemed to have been joined to it came away. During the same and following day, there was considerable diuresis, but afterwards the urine became scanty. The motions were loose and dark. Her general state improved, and she left the hospital apparently cured.

The next patient was also a woman, aged about forty-four, who had apparently got the worm at Fort Beaufort, in the Cape of Good Hope, at which place she resided some time. She began to pass joints on the year following that on which she went to that place. Worms are very common among the natives, who are in the habit of taking infusion of pomegranate bark, turpentine, and also a scraped root, called "Cacay." Of all the remedies which she has used, the pomegranate was the most effectual, which however has not cured her, as she continues to pass joints. Her symptoms are gnawing pain, and constant feeling of sinking in the epigastrium, pain in limbs, general lassitude, dimness of sight, loss of appetite, short dry cough, and a sensation as of the movement of the tænia. She took kousso as the other patient; it was followed by slight nausea for a quarter of an hour. Its taste, she says, is very much like pomegranate. A tapeworm, of a very large size, was passed four hours and a half afterwards, and subsequently some isolated joints. The head could not be found; but there is no doubt that it came away, on account of the narrowness of some of the pieces. During the same and two following days, numerous joints, apparently long dead and partially decayed were passed.

The other was a delicate, anæmic-looking woman, who had had the usual symptoms of tapeworm for some time; but did not, to her knowledge, pass any until three weeks, and again one week ago. Is a native of Norfolk; but has latterly resided in Soho, which neighbourhood is supplied with water by the New River Company. She had the kousso exhibited in the same way, followed by a dose of carbonate and sulphate of magnesia. A portion of worm passed with every motion. Both these patients have left the hospital improved in health, and apparently free from any symptom of tænia.—*Med. Times, April* 20, 1850, *p.* 296.

63.—*Observations on Vermifuge Medicines.* By Dr. Cazin.—Dr. Cazin, of Boulogne-sur-Mer, having had the opportunity of treating a large number of worm cases, has published the following interesting account of his experience. He states that he has frequently employed the common *spigelia* or *worm-grass.* He administers it in the form of decoction, prepared by boiling two drachms of the herb in a quart of water to one-half. The decoction is then expressed, strained, and flavoured with a little lemon-juice and a sufficient quantity of sugar. The dose for an adult is two wine-glassfuls, followed by a wine-glassful every six hours until the desired effect is produced. To children and delicate persons a smaller quantity is to be given.

Wormwood (absinthium) is an excellent indigenous anthelmintic; it is also a powerful tonic and stimulant, the use of which, continued after the expulsion of the worms, prevents their reproduction. M. Cazin often uses a wine prepared by digesting an ounce of wormwood, with an equal quantity of garlic, in a bottle of white wine, of which he gives from one to three ounces every morning. This wine is well-adapted for poor lymphatic subjects, wasted by wretchedness, and suffering from the influence of a marshy soil. The absinthium maritimum is likewise a very good anthelmintic. M. Cazin gives it to the extent of one or two drachms boiled in four or five ounces of water, with the addition of some white sugar, or of any anthelmintic syrup. This is quite a popular remedy in the maritime districts, and almost always succeeds with children affected with worms.

Although a case of poisoning by *cevadilla* has been reported, M. Cazin has administered this vermifuge with success in cases in which ordinary anthelmintics had but little effect; but he has always commenced with a very small dose, in order to ascertain how far it would be borne by the digestive organs. For children the dose of this plant is from a grain and a half to four or five grains of the powder of the seeds, mixed with syrup of rhubarb; for adults eight or nine grains, with the addition of a little sugar and a few drops of oil of fennel. In each case the dose is to be repeated daily for four days, after which the infusion of camomile is to be given.

Assafœtida possesses acknowledged anthelmintic properties, and is suitable for cases of sympathetic nervous affections produced by the existence of worms. It thus, like valerian, fulfils a twofold indication. In a case of nervous affection, which M. Cazin believed to be idiopathic, the administration of assafœtida both determined the disease and revealed its true cause, by effecting the expulsion of a number of lumbrici. This result has, in three cases of chorea and in two of epilepsy, enabled him to recognise that sympathetic irritation, depending on the presence of intestinal worms, was the sole cause of disease in these instances. Under ordinary circumstances M. Cazin frequently combines assafœtida with calomel in pills. This combination, of all those that he has employed, succeeds best in expelling lumbrici. He has also combined it with black oxide of iron, particularly in anemic patients. Assafœtida may be given in powder, in doses of from four grains to half a drachm.

The essential oil of *turpentine* is not merely useful in cases of tænia, it is also decidedly efficacious in expelling the lumbrici. M. Cazin has sometimes, in cases of lumbrici and ascarides, administered with advantage turpentine enemata, prepared by suspending, by means of yolk of egg, from one drachm to half an ounce of the oil in decoction of tansy, absinthium, worm-seed (semen-contra), or Corsican moss.

Common *salt* is very destructive to worms; it is given alone in large doses dissolved in water; it should be taken on an empty stomach. M. Cazin also frequently adminsters it in the form of enema, with brown sugar, linseed or poppy oil, and a sufficient quantity of water. With children it almost always succeeds.

Like all tonics, *iron* has the advantage of destroying worms, at the same time that, by imparting tone to the intestines, it prevents their

reproduction. From six to eight grains of iron filings, mixed with an equal quantity of rhubarb, and taken two or three times a day, have often been sufficient to expel the worms contained in the intestines. M. Cazin succeeded in rapidly curing a boy nine years of age, emaciated and pale, whose sleep was disturbed, and who was suffering from spasmodic movements similar to those which characterize chorea, by the exhibition of pills of sulphate of iron, combined, according to Fuller's formula, with aloes, senna, &c., under which treatment he voided twenty-three lumbrici in four days. He has also used with remarkable success Bosen's mixture, containing extract of black hellebore and sulphate of iron. But what he chiefly gives to children, as well as to adults, is the syrup of citrate of iron (four parts of citrate to sixty of simple syrup, and one of essence of lemon), in doses of from two drachms to half an ounce to children, and from half an ounce to two ounces to adults.

M. Cazin remarks that *calomel*, so efficacious as an anthelmintic, ought never to be combined with an alkaline chloride, as the formation of corrosive sublimate would probably ensue from their admixture. In like manner, the combination of calomel with cherry-laurel water, or emulsion of bitter almonds, would give rise to the development of two formidable poisons, corrosive sublimate and cyanide of mercury.

The effects of the *male fern*, *tin*, *pomegranate bark*, *hellebore*, &c., require merely to be noticed; and the properties of the pomegranate root bark are so well known that they need not be dwelt upon. M. Cazin has remarked nothing particular respecting other anthelmintics. He merely says that *cod-liver oil* has succeeded with him in the cases of two females, one of whom passed twelve lumbrici the same day that she had taken in the morning three table-spoonfuls at intervals of an hour.

But whatever be the medicine selected, we must not, like routine practitioners, be content when the worms are killed and dislodged, with this merely palliative cure. A very important indication remains to be fulfilled, viz. to prevent their reproduction. This object is attained, according to M. Cazin, by the adoption of a tonic and stimulant regimen, which must be long continued, and, above all, by the employment of bitter and chalybeate preparations. He has found the ferruginous chocolate to be sufficient, in the case of children, to prevent the relapses which are for many years very apt to occur. Wine taken while fasting has succeeded with the poor inhabitants of the marshes, accustomed to live only on vegetables and milk; and he has also remarked its efficacy as a preventive of worm affections in other instances.

To these observations of M. Cazin, the Editor of the 'Journal de Médécine', has appended the following practical remarks. The number of experiments tried by M. Cazin leaves no room for doubt respecting the enormous amount of worm affections which he must have met with. Such a result may appear strange to Parisian physicians, who attribute to the presence of worms in the intestines only a very trifling influence over the symptoms formerly ascribed to them. But if worm affections are rare among the inhabitants of large towns, they are frequent and generally more serious among the peasantry, and particularly among those who are poor and placed in unfavourable hygienic circumstances. We

shall, therefore, take the present opportunity of mentioning the efficacy of *brown santonine*, lately brought under the notice of the readers of the 'Bulletin de Thérapeutique', by M. Gaffard, an apothecary at Aurillac.

The difficulty experienced in procuring pure santonine, both on account of its high price, and for other reasons, has induced M. Gaffard to endeavour to obtain from *worm-seed* a product which may possess the advantages of the former, and at the same time be free from the objections to the use of the latter. This product he calls brown or impure santonine; it is obtained in the following manner:

Take of Aleppo worm-seed, three ounces; carbonate of potash, one ounce; slacked lime, sifted, half an ounce; water, from three pints to three pints and a half. Place the mixture on the fire, stirring occasionally with a wooden spatula; let it boil for an hour; on removing it from the fire pass it with expression through a linen cloth, let it settle, decant, and add hydrochloric or nitric acid until it reddens litmus without being sensibly acid to the tongue. Allow it to rest, pass it through a filter previously moistened, or through a piece of close canvas, and allow the product which remains on the filter to dry in the open air until it acquires the consistence of firm butter. This product, which is a mixture of santonine, resin, and essential oil, will answer for the various pharmaceutic forms in which the practitioner may wish to exhibit it. M. Gaffard gives it in the form of lozenges composed as follows:

Brown santonine, three drachms; powdered sugar, thirteen ounces; powdered gum, one ounce and a half; essential oil of lemon, twenty-five drops. Place the brown santonine in a marble mortar; add by degrees, and with constant trituration, the sugar mixed with the essential oil and the gum, so as to make a homogeneous powder. Form with a sufficient quantity of water a mass of the desired consistence, and divide it into lozenges, each of which shall weigh, when dried, fifteen grains; each lozenge will then contain somewhat more than one-third of a grain of brown santonine.

For infants under six months, the dose will be one lozenge night and morning; from six months to a year, two lozenges night and morning; from one to two years, three, and from two to four years, four, night and morning; for children of five years and upwards a lozenge for each year of the child's age should be given night and morning. The medicine to be continued until the desired effects are produced.—(Journal de Méd.)—*—Dublin Quart. Journal, May* 1850, *p.* 489.

64.—*On the Treatment of Constipation by Electro-Galvanism.* By Dr. W. Cumming, Edinburgh.—It is perhaps a bold assertion that few cases of constipation will resist the action of electro-galvanism; but the number of cases of various kinds in which I have used it with success, leads me to infer that in all, except those arising from organic or mechanical causes, this agent will not only act as an aperient, but give such tone to the muscular and mucous tunics, as in time will lead to the natural discharge of their functions. The use of galvanism has been

too extensively limited to paralysed organs. The same influence that will restore vigour either entirely or partially to a muscle or set of muscles that have lost their power, will obviously, under due regulation, impart it to those in which it is diminished; and probably few will question that the muscular fibres of the intestinal canal have a function to perform not the least important of the various portions of that tube: that in torpor of the bowels they are practically partially paralysed; and that therefore we might *à priori* expect that galvanism, by supplying an appropriate stimulus, first directly, and then secondarily by its probable action on the sympathetic system, would have a beneficial operation. If this be true (and if not theoretically, I am satisfied that it is practically so), what innumerable wretched symptoms and feelings may not be removed, to which so many of both sexes are victims, and which all medical practitioners have daily to contend against as the accompaniments and consequences of *habitual constipation!—Med. Gazette, Dec. 7*, 1849, *p.* 972.

65.—*On the Treatment of Diarrhœa by Oil of Turpentine.* By Dr. J. J. Trayer, Queen's County, Ireland.—[Dr. Trayer speaks very highly of this medicine, which he used extensively in the diarrhœa which prevailed in his locality, at the time when cholera was so prevalent in other parts of the island. The disease was marked by very sudden invasion, after exposure to cold, or the ingestion of some noxious article of diet; the stools were fluid, often tinged with blood, very frequent and exhausting; there was very little abdominal pain, but distressing pain and sense of fatigue in the loins and lower extremities; and there was frequently vomiting. With respect to the treatment, Dr. Trayer says:]

The medicine which I use as a sheet anchor in these cases is the rectified spirit of turpentine, in small doses (from 5 to 20 minims), repeated more or less frequently, and variously combined as the circumstances of the case demand; the most usual combination being the tincture of opium.

In a case of average intensity, my mode of proceeding is this:—If my patient is still up, I order him at once to bed, and apply a light but large bran poultice, moistened with infusion of camomile, and occasionally sprinkled with laudanum, over the abdomen. This being covered with oiled silk, maintains its warmth and moisture for a long time. A large piece of patent epithem is an admirable substitute when it can be obtained. Warm jars placed to the feet, a liberal supply of bedclothes, and a warm, but not close, atmosphere in the bed-room, render great assistance.

As soon as it can be obtained (I generally carry it with me), a dose of spirit. terebinth., about ℥xv., is given, combined with laudanum; or if this be for any reason contra-indicated, an equivalent of some other sedative (hyoscyamus, e.g.); or sometimes without any other medicament. This dose is felt almost immediately to check the disease; and here, if I were to describe my own feelings, the aptest expression I could use is, that a message seems, as by electric telegraph, to be conveyed on the

moment to the whole canal, that the discharges are to cease. In place of the sickly nausea, of the coldness and sensation of incessant movements of the bowels, which tell you that your serum is oozing out, a feeling of warmth and cheerful tone at once pervades the system, and tells you that the disease is checked: in fact, this first, or a second dose, would generally complete the cure if the patient would remain in bed for a few hours, and for a day or two observe a strict dietary. If the process be not always so speedy, still, perseverance in the use of these measures has as yet succeeded in every case in which I have tried them, with one exception.

I should here mention what I have found the easiest way of taking the rather disagreeable medicine I propose.

Having prepared the tincture of hops with some fine French brandy, I put in a wine-glass about a drachm of this tincture. I drop in the spirit of turpentine, which floats on its surface. Then, just as the patient is going to drink it off, half an ounce of cold spring water being added, the turpentine is so engaged in the molecular movements that occur while the spirit and water are mixing, as to disappear. At this moment the draught is easily swallowed; and, if care be taken not to wet the lips, its flavour very soon passes off. After a few seconds the turpentine again floats, and, if left for some hours, the mixture becomes troubled and milky, and is not easily taken. Each dose should, then, be dropped out as it is required.—*Med. Gazette, Nov.* 23, 1849, *p.* 882.

66.—ON VARIOUS FORMS OF INFANTILE DIARRHŒA.

By M. Trousseau.

Besides lientery, there are several forms of diarrhœa which affect infants, and with the nature of which it is important to become acquainted. *Bilious diarrhœa* is characterized by bilious mossy stools of the colour of oil. There is also a modified form of bilious diarrhœa, in which the stools resemble chopped vegetables. There is the appearance of the débris of spinage in the stools, which are also spotted with a liquid of the colour of sulphate of copper. This modification of bilious diarrhœa is very common in new-born children, but becomes more rare as age advances. *Mucous* or *glairy diarrhœa* is characterized by the resemblance of the stools to slightly boiled white of egg. This is sometimes combined with ordinary bilious matter, and more rarely with food: sometimes also blood is present. This form is commonly attended with pain, but is fortunately more amenable to treatment than the others. It appears to be confined to the large intestines. In *pseudo-membranous diarrhœa,* the stools are imperfectly moulded, and covered with a pseudo-membranous concretion of thickened mucus or fibrin. The most severe form of all, exclusive even of epidemic conditions, is the *purely serous, watery, or choleriform diarrhœa,* or *infantile cholera*, which is very common in infants at the breast.

The following is an abstract of the opinions of M. Trousseau on the symptoms of each of these forms of diarrhœa.

In *bilious diarrhœa*, the stools are yellow and abundant, and almost always accompanied with bilious vomiting, with more or less intense fever, and increase of the biliary and pancreatic secretion. It is more manageable than lientery, and yields to remedies in children as well as in adults. It is a remarkable fact, that if the diarrhœa be very abundant, the vomiting ceases; but if, on the other hand, the diarrhœa is abruptly suspended, the vomiting immediately returns. This is especially remarkable in children, and is considered by M. Trousseau to have an important bearing on the treatment. When the stools are yellow, the patient is not severely ill; but when they are copious and green, and there is fever, the prognosis is more unfavourable. The *glairy diarrhœa* commonly depends on inflammation of the large or small intestines. There are colic and fever, but rarely vomiting. The functions of digestion and assimilation still go on to some extent. The pseudo-membranous secretions are extremely rare as a result of inflammation of the large intestines, but are most commonly observed after enteritis. In *choleroid diarrhœa*, which is the most severe form, after one, two, or three days of bilious diarrhœa, the children are suddenly seized, more frequently in summer than in winter, with irrestrainable vomiting, and with serous dejections, which scarcely colour the linen cloths green. At the same time, the child utters constant cries; the eyes are hollow, the respiration impeded, the abdomen is drawn in, and the skin assumes a blue tint; and the patient dies. M. Trousseau does not hesitate to affirm, that this disease kills more than one-half of the children at the breast, for it is at this age that it is principally observed. It rages independently of an epidemic of cholera, from the age of one to two years, that is to say, during the first dentition, and attacks few children who have been weaned for some time.

Treatment.—In bilious diarrhœa, the first remedy to be given is ipecacuanha, in emetic doses, of fifty centigrammes to a child at the breast, a gramme to older children, and two grammes to adults. It is given three days in succession, and commonly modifies the vomiting, diarrhœa, and fever. If it fails, ten centigrammes of sulphate of copper may be given, in four doses, at intervals of ten minutes, dissolved in water. This has produced astonishing results in three children. In one child, who had been labouring under vomiting and copious diarrhœa for three days, the number of stools was reduced from ten to three by the administration of sulphate of copper. In a second, it succeeded, after the failure of bismuth and saline purgatives. In a third child, who was labouring under morbillar pneumonia, which was treated by antimonials and digitalis, diarrhœa was arrested by sulphate of copper. Rochelle salt, sulphate of magnesia, or magnesia alone, or combined with calomel, are useful in such cases. It is good practice, for instance, to give five centigrammes of calomel in the evening, and twenty-five or thirty centigrammes of magnesia the next morning.

The green form of diarrhœa is equally well combated by the preceding means, but especially by saline purgatives, as the potassio-tartrate of soda. If, however, the stools remain green at the end of two or three days, it will be found advantageous to administer twenty-five or thirty centigrammes of magnesia, with an equal quantity of sugar, at the same time

applying cataplasms to the abdomen, and administering enemata. In case of failure of these means, emetics may be employed.

In glairy diarrhœa, if there be no vomiting nor flatulent distension, the treatment may consist of injections. If the pain be severe, an injection, consisting of from five to ten centigrammes of nitrate of silver in two or three hundred grammes of distilled water, should be administered. When returned, it is immediately followed by a similar one, containing a drop of laudanum. This is repeated once a day for three or four days, according to the amount of glairy mucus and blood in the stools. When there are flatulent distension and fever, it is well to commence the treatment with ipecacuanha, then to give Rochelle salts, and afterwards to employ lavements, and not to give opium till there be no more vomiting. The injections may contain sulphate of copper or of zinc, the quantities being double that of nitrate of silver. It is rare, says M. Trousseau, that acute colitis will not yield to this treatment: sulphate of copper is almost as active, and quite as excellent, as nitrate of silver.

Pseudo-membranous diarrhœa is rare in children, but common in adults, especially in constipated females. It yields readily to enemata of nitrate of silver, or sulphate of zinc or copper, and to belladonna given internally. Children affected with this disease appear to void boiled rice, the stools containing the fibrinous productions developed on the surface of the intestinal excoriations, which are seated either in the rectum or the colon. It is treated as in adults: calomel may also be administered in the form of enema, by triturating one or two grammes with a thick solution of gum, and injecting it every one or two days.

The most severe form is *infantile cholera*. A child after it has been weaned, or while it is suckling, or during dentition, has diarrhœa: this is considered *salutary* by the nurses, and by medical men, who misinterpret the saying of Sydenham, that a child's bowels should be open during dentition. This is a grave error, which should be guarded against. If the diarrhœa last one or two days, it may be let alone; but if it continue beyond that time, it must be moderated and arrested. If this be not done, a child may have diarrhœa for ten days, a fortnight, or a month, without any apparent constitutional disturbance; on a sudden, it is seized with violent vomiting and abundant serous diarrhœa; the eyes become hollow, the skin blue, the tongue cold, the pulse small, and the muscles frequently soft and flaccid like rags. The vomited matters are greenish, generally with a copper colour; the diarrhœa is so completely watery in most cases, that the linens seem wetted with urine; in other cases, they seem as if dipped in a solution of copper. The child utters continual cries, and is restless and sleepless. Sometimes the diarrhœa stops, and the vomiting becomes violent; at others, the diarrhœa and vomiting are partially suspended, but not entirely arrested; the child soon loses strength, and dies. This disease lasts from twelve hours to five or six days, but the most common duration is from twenty-four to forty-eight hours.

The first remedy which presents itself is opium. In this, M. Trousseau has very little confidence. It may arrest diarrhœa, but the vomiting continues; and if the opium be given by mouth, it is more likely to

aggravate the vomiting and kill the patient, than to cure him. Astringents, such as monesia, rhatany, bistort, tormentilla, cinchona in draught and in injection, etc., are of no use in this form of diarrhœa. The only treatment on which M. Trousseau depends, is based on emetics and purgatives. As an emetic, powdered ipecacuanha is the best; among purgatives, the potassio-tartrate of soda, in doses of four, five, or ten grammes, is to be preferred. But in the proper choleraic form, we must at once use mustard baths. The child must be kept in the bath until the hands of the person holding it are attacked with an insupportable smarting; it is then wrapped in woollen cloths, and at the same time has administered to it a little syrup of ether, with mint and Seltzer water. When moderate reaction has set in, we may advantageously give ipecacuanha and Rochelle salts, to modify the condition of the alimentary canal. If at the end of forty-eight hours, there be heat, slight stupor, and other typhoid symptoms, and the diarrhœa continue at the same time, M. Trousseau gives a mixture, containing one centigramme of nitrate of silver, with thirty grammes of distilled water and twenty grammes of syrup; and injects twice or thrice daily, an enema containing from five to ten centigrammes of nitrate of silver in two hundred grammes of distilled water. The mustard bath is continued, if required. When the nervous or typhoid symptoms are inclined to be obstinate, the infant might be plunged in a cold bath for one or two minutes, or have a slight cold affusion. These means, aided by refreshing drinks of milk or beef-tea, often put an end to the disease. We see, then, that in indigenous cholera, the indications are almost the same as in epidemic cholera. Nevertheless, whatever is done, the greater number of children die, even after they are thought to be recovering. Two or three drops of laudanum may arrest the vomiting and diarrhœa; but let no one trust to this. As long as the pulse is small, and there are slight fever, restlessness, cries, etc., the condition of the child is precarious, even though the vomiting and diarrhœa have been arrested. The most favourable signs are the return of a gentle heat to the skin, and the diminution of restlessness; because these symptoms indicate, even though the diarrhœa persist, that there is nothing left but ordinary enteritis. (Journal de Méd. et de Chir. Prat., 1849, p. 535.)—*London Journal, Feb.* 1850, *p.* 187.

DISEASES OF THE URINARY ORGANS.

67.—ON THE ACIDITY OF THE URINE.

By Dr. H. Bence Jones, F.R.S., Physician to St. George's Hospital.

From experiments, it appears that immediately before each meal the urine showed the highest degree of acidity; and the water passed two, three, or more hours, after food, always showed a lower degree of acidity. The decrease was greatest three hours after breakfast, and five or six hours after dinner, when it reached the lowest point. The acidity of the urine then increased, until immediately before food, when it again reached the highest limit. If no food was taken, the acidity of the urine did not

decrease, but remained nearly at the same degree of acidity for twelve hours, but then, directly after food was taken, the acidity fell.

When animal food only was taken, the diminution of the acidity after food was more marked and more lasting than when a mixed diet was taken. The increase of acidity before food was hardly so great as when mixed diet was taken.

When vegetable food only was taken, the decrease in acidity was not so great as when animal food was taken—that is, though the urine became neutral after food, it did not become highly alkaline. The increase in the acidity of the urine was higher before vegetable food than it was before animal food was taken.

Dilute sulphuric acid was taken in large doses, but it did not produce a very decided effect. Nine drachms of dilute sulphuric acid in three days slightly diminished the decrease in the acidity of the urine after food; but the acidity before food was very slightly, if at all increased thereby.

By comparing the acidity of the whole quantity of urine passed in twenty-four hours for three days when no sulphuric acid were taken, with the acidity when nine drachms of dilute sulphuric acid were taken during three other days, the increase in the acidity, though not very marked, was decidedly apparent. The average quantity of carbonate of soda required to neutralise the whole of the urine made in twenty-four hours, when no sulphuric acid was taken, was 15.39 grains. The average quantity required when sulphuric acid was taken, was 20.38 grains. There was but little difference in the quantity of urine made.

Tartaric acid, in large doses, produced a decided effect on the acidity of the urine. 354 grains of dry and pure tartaric acid, taken in three days, increased the acidity of the urine; but in that time it did not render the effect of digestion on the reaction of the urine less apparent than it was when no acid was taken.

Liquor potassæ, in large doses, produced a decided effect in diminishing the acidity of the urine; but it by no means renders the urine constantly and permanently alkaline. Its effect seems to pass away rapidly.

An ounce of strong liquor potassæ, taken in three days, did not counteract or conceal the influence of digestion on the reaction of the urine.

Tartrate of potash produced a most decided and rapid effect on the acidity of the urine; 120 grains of pure dry tartrate of potash, dissolved in four ounces of distilled water, made the urine alkaline in thirty-five minutes. In two hours the alkalescence had disappeared; but after the next meal, the effect of the tartrate of potash was again apparent. Ten drachms of tartrate of potash, in three days, produced but little, if any effect on the acidity of the urine after it had been omitted for twenty-four hours.

The result of these experiments is, that the acidity of the urine is always changing, and that the changes depend on the state of the stomach. Whilst much acid is in the stomach, the acidity of the urine is for that time diminished. As the acid returns from the stomach, the acidity of the urine is increased, and usually it reaches its highest limit before food is again taken.

Animal food causes a greater oscillation than vegetable food does, and when no food is taken, the variation is very slight.

The influence of animal food in lessening the acidity of the urine, and the influence of vegetable food in increasing the acidity, are in remarkable contrast. Possibly the effect of oil, starch, and sugar on the acidity of the urine may be separated, and the influence of each may be proved. That these three substances, after they are taken into the stomach, probably pass through various neutral and acid states before they become carbonic acid and water, I have already mentioned to you. The urine may from these substances receive many acids which, when animal food alone is taken, may be altogether absent. That vegetable acids partly pass off by the kidneys, the experiments with tartaric acid sufficiently prove.

The variations in the acidity of the urine indicate corresponding variations in the alkalescence of the blood. In both fluids, the variations are unceasing and opposite. I again repeat that this state of alkalescence or acidity of the urine does not depend upon disease, and most probably depends solely upon the irritability of the stomach.

You will probably long since have asked,—What is the acid in the urine? And to this question I cannot yet give you a certain answer. I am not certain that the acidity is always produced by biphosphate of soda, though at present this is the most probable answer that is known. It is probable that there is generally no free acid in the urine, but that the reaction arises from some acid salt; but I am certain that in some instances of strongly acid reaction, the quantity of phosphate of soda has been extremely small, much too small to produce the acidity, which was very decided.

The nature of the acid is not of great consequence, but the variations in the acidity of the urine in health give practical results of importance. For if you find that the urine passed at one hour of the day is highly acid, you may find that the water made at another hour of the same day is nearly or quite alkaline; and if you are tempted to prescribe alkalies for the highly acid reaction of the urine made long after food, you may be led to prescribe acids for the alkaline reaction of the urine made soon after food. Thus, according as you may see your patient early or late, he may be put on a course of caustic potash or nitro-muriatic acid.

The reaction of test paper on urine made at any one hour of the day should never determine the use of acid or alkaline medicines. The different deposits which take place in the urine are far better tests of the state of the urine, and of the necessity for these remedies. If you are guided by the reaction of test paper, the total quantity of urine made in twenty-four hours must be examined.—*Lancet, Feb.* 9, 1850, *p.* 164.

68.—*On the Relation of the Specific Gravity of the Urine to its Solid Contents.* By Dr. H. Bence Jones, F.R.S.—Tables have been constructed professing to tell how much solid matter is contained in urine of any specific gravity. It is said, that by taking the specific gravity, and referring to the table, the quantity of solid matter may be immediately determined. If the urine were simply a solution of one substance,—

as, for example, urea in distilled water,—such tables could be made to give the truth; but when many different substances are dissolved in water, no tables can be trust-worthy. A small quantity of one substance may increase the bulk of the urine more than a larger quantity of another substance, or equal quantities of different substances may increase the bulk of equal quantities of water in which they are dissolved, to a very different degree; so that the solid residue in each might be equal, while the specific gravities of the solutions might be different. Experiment proves this, in the case of the urine.

[After detailing a number of experiments, Dr. Jones says]

These experiments show that the quantity of solid contents cannot be determined by taking the specific gravity.—*Lancet, Feb.* 9, 1850, *p.* 163.

69.—*On the Detection of Oxalate of Lime in the Urine.* By Dr. H. Bence Jones, F.R.S.—Oxalate of lime is so frequently found in the urine of those who are in a good state of health, that I do not consider it as indicating any disease, but only a disorder of no serious importance. It scarcely indicates a more serious derangement of the general health than a deposit of urate of ammonia does. It may occasionally be found in the urine of all who lead sedentary lives, taking insufficient air and exercise, and more food than is requisite for the daily wants of the system. I have found it in the urine of those who are free from every complaint. Even in the urine of healthy children it may very frequently be seen. I have met with it in every kind and stage of disease. In the fracture wards of St. George's Hospital I have very frequently found it. The most severe case I ever saw, was an artist, aged thirty, dying of abdominal aneurism. In cases of indigestion, especially where flatulence occurs; in cases where no indigestion ever was felt; in skin diseases; in cases where the skin never was affected; in cases of acute rheumatism, of acute gout, of fever; in sciatica, in a gentleman seventy-four years old, with spermatorrhœa; and in the diseases of women and children, octohedral crystals occur. So frequently is oxalate of lime mixed with urate of ammonia in sediments and calculi, that I have returned to the conclusions which Dr. Prout originally published in the second edition of his work. After giving some details of twelve cases of oxalic calculus, he says, "We are authorized to draw the following conclusions:—6th. That from the dissection of calculi formerly mentioned, it appears that the oxalate-of-lime of diathesis is preceded and followed by the lithic acid diathesis -a circumstance which seems to be peculiar to these two forms of deposit, and when taken in conjunction with the other circumstances already related, appears to show that they are of the same general nature, or, in other words, that the oxalic acid merely takes the place, as it were, of the lithic acid, and by combining with the lime naturally existing in the urine, forms the concretion in question. 7th. (Dr. Prout continues:) The diathesis being of a similar nature, the principles of treatment adapted for counteracting the original tendency to it must be also similar." And, as a medicine, muriatic acid was used to change the diathesis from the oxalate of lime to the lithic acid.

I find that the two deposits together may be met with daily on careful examination, by the microscope, of the urine in different cases of disease; and if the examination is made at different hours of the same day on a case in which oxalate of lime occurs, we shall not unfrequently find three hours after food, that instead of urate of ammonia being mixed with the oxalate of lime, there is phosphate of lime and oxalate, and no urate of ammonia. Thus at one hour we may find oxalate of lime alone; at another, oxalate of lime with urate of ammonia; and at a third examination, oxalate of lime and phosphate of lime, or phosphate of lime only; the variations in the acidity of the urine being the chief cause of the differences in the deposit.

Oxalate of lime is so insoluble in distilled water that it might well be considered to be insoluble in the urine. Its occurrence in the form of crystals shows, however, that it cannot be insoluble; for crystalline form implies deposit from solution. Careful observation of the urine also shows that the oxalate of lime is soluble therein.

A medical man, in very tolerable health, aged fifty-nine, passed about a drachm of water at half-past ten in the morning, saying that he had a good deal of irritation. I examined it immediately. It was acid, and had a slight cloudiness. Under the microscope I saw many globules, like mucus, some of them slightly serrated. I saw some dead perfectly-formed spermatozoa, and a great many particles looking like the bodies of spermatozoa, tail-less—that is, slightly triangular and highly refracting. I looked most carefully for oxalate of lime, expecting to find it; but I could not find a single crystal anywhere, and no urate of ammonia was to be seen. At nine the following morning I again looked at the drachm of urine. There was a very transparent cloudy sediment, like mucus, only more transparent, occupying nearly one-fourth of the liquid in height. On examining a drop, myriads of small crystals of oxalate of lime were seen, and not a particle of urate of ammonia or uric acid.

I had for some time passed over similar observations, by supposing that my first observation had not been made with sufficient care, but from the above, and other cases that have since occurred to me, I am certain that it sometimes requires many hours for the oxalate of lime to crystallize out. You cannot say that no oxalate of lime exists in any urine until at least twenty-four hours have elapsed from the time of the passing of the water.

It requires no skill and no preparation of the urine to find the oxalate of lime. The urine should be left to stand for twenty-fours in a bottle, or tall glass; the upper part of the fluid should be poured off, and the last few drops remaining in the glass or bottle should be examined. A magnifying power of 320 times is generally sufficient, but the crystals are sometimes so small, that twice this power is necessary to determine the form. Generally oxalate-of-lime octahedra are thus found without the least difficulty, sometimes in large single crystals, very frequently in aggregations of small octahedra, forming microscopic calculi. Dr. Golding Bird was the first observer who stated that these crystals, which had for some time previously been observed in urine, were oxalate

of lime. The chemical proof is difficult, if not impossible, to obtain, for the octahedral crystals are rarely present in sufficient quantity to admit of perfect examination.—*Lancet, Feb.* 23, 1850, *p.* 225.

70.—OBSERVATIONS ON DIABETES.

By Dr. H. Bence Jones, F.R.S.

The excretion of sugar by the kidneys constitutes the disease which is called diabetes. The amount of sugar in the urine is frequently less than is met with in milk; but the important point with the medical man is the determination of the presence of the sugar and not the quantity in which it exists. The proof of the existence of sugar in the urine is of primary importance; the question of how much sugar is comparatively of very little consequence. Hence the tests for the sugar in the urine are of more value than the methods of making quantitative analyses of it.

All the tests depend on the facility with which the composition of the sugar is changed. For the medical man the most valuable test is the action of some metallic oxides, aided by heat and alkali, on the elements of the sugar. Oxide of copper and oxide of silver are the most worthy of your attention.

To a drachm of suspected urine, add two or three drops of a saturated solution of sulphate of copper, and then two drachms of caustic potash; the hydrated oxide of copper, which first is precipitated, redissolves if sugar or many other organic substances are present, becoming of an intense blue, and when heat is applied, if grape sugar be present, the oxide of copper is rapidly reduced, and reddish-yellow sub-oxide of copper is precipitated.

The reduction of the oxide of copper is effected by the carbon of the sugar.

If cane sugar instead of grape sugar be used for this experiment, the rapid reduction of the oxide to the suboxide will not take place; the bright blue solution will be formed, but the heat must be very long continued to effect the reduction; uric acid and albumen will also effect a slow reduction of the oxide of copper. You will from this see that it is the rapidity with which the grape sugar is decomposed which constitutes the test. It is always well to repeat the experiment, if it be an unsuccessful trial, with more or less sulphate of copper than was used in the first experiment. If very little sugar is present, too much sulphate of copper hinders the reaction from being clearly seen; if very much sugar is present, the reaction will come out more distinctly by adding more sulphate of copper.

The reduction of oxide of silver by grape sugar and cane sugar is beautiful, and though not quite so easy a test as the oxide of copper test for diabetes, yet it may be often used as an additional proof where any doubt exists. A saturated solution of nitrate of silver is made—a few drops of this are to be placed in a test tube, and a single drop of caustic ammonia is to be added; if a brownish oxide of silver falls, a single drop of the suspected urine is to be added, and the test-tube is then to be

heated, and the contents to be well shaken. In a few seconds the sides of the tube will be coated with silver, and the metallic lustre will be seen. The carbon of the sugar has taken the oxygen from the oxide of silver. Carbonic acid and metallic silver have been produced.

Potash alone decomposes grape sugar, and so it has been used as a test of diabetes. When heat is applied to urine containing grape sugar and liquor potassæ, the sugar is decomposed into formic, sacchulmic, melassic acids, and thence a great change in colour results; no precipitate forms, and on this account the test ought not solely to be relied on, as some deepening of colour may ensue when no sugar is the urine. Fermentation by means of yeast is the oldest and surest evidence of the presence of sugar, and by this means the quantity of sugar present is best determined, either by the loss of carbonic acid, or by determination of the quantity of alcohol produced.

Another easy and satisfactory test is the appearance of the residue of the urine after a drop is evaporated on a slip of glass to perfect dryness. This can be done rapidly over sulphuric acid by placing a slip of glass on a small capsule of strong sulphuric acid, and covering the whole with a bason. When dry, granular specks are seen, which, if examined by the microscope, appear to be tufts of crystals, most probably a compound of urea and sugar. If the atmosphere is very moist, these crystalline granules rapidly deliquesce. If by two or more of these tests the presence of sugar is established, it is not necessary to make any quantitative analysis; for the medical man a sufficiently near approximation is obtained by taking the specific gravity of the urine. It is not even necessary to refer to Dr. Henry's tables, in which he gives the solid contents of diabetic urine of all specific gravities. All the information you can use you will obtain by comparing, from day to day, or from week to week, the specific gravity and the total quantity of urine passed in twenty-four hours. The specific gravity will rise or fall according as the sugar is increased or diminished if the quantity of water is fixed.

If the urine contains albumen also, the test for sugar is more uncertain, and it can in doubtful cases only be made sure by evaporating the urine to perfect dryness, reducing it to a fine powder, and treating it with boiling water, and then filtering it. The sugar is dissolved, the albumen remains undissolved. In the 26th volume of the 'Medico-Chirurgical Transactions' you will see that sugar may thus be detected in the serum of the blood.

Now, regarding the frequency of the occurrence of diabetes, it is by no means so rare as has been said; the delicate tests we possess will discover it to be a not unfrequent disease long before the ordinary symptoms of the complaint appear. Most of the cases at present recorded or observed are those in which the disease has been fully formed; and yet, from Dr. Prout's great experience, we can see that even such cases are very frequent. In the edition of

1821, Dr. Prout gives no cases of his own.

1825, twenty cases; the average of four years was five cases a year.

1840, no statement is made.

1843, five hundred cases; the average of eighteen years was twenty-seven cases a year.

1848, seven hundred cases; the average of five years was forty cases a year.

In all these cases the disease was probably fully established, and hence perhaps the statement as to the incurability of the disease. So far as can be discovered, there is no organic disease which renders cure impossible. Extreme disorder of functions is all that can be made out. Altered chemical action constitutes the disease, and yet chemical investigations have not enabled us to discover the remedy. One cause of this is, that at present the theory of the disease is unknown. I shall attempt to show you the present state of our knowledge on this question, and give you the explanation of the disease, which at present appears to me most probable.

In my lecture on Digestion, I traced the course of a grain of starch, in its chemical changes, passing through dextrin, sugar, and vegetable acid, to carbonic acid. The greater portion of the starch we take passes into dextrin; all the dextrin becomes sugar, and all the sugar is converted into vegetable acid previous to its being oxidized into carbonic acid. The changes which occur in health may be represented by the following series—starch, dextrin, sugar, vegetable acid, carbonic acid. There may be many intervening terms in this series, but these are sufficient to show the direction and nature of the chemical changes which occur in the body.'

The disease—diabetes, I consider arises from the arrest or stoppage of these healthy and necessary changes. The series of changes is stopped at the sugar; from some cause the conversion of the sugar into vegetable acid and carbonic acid does not take place, and the whole series of changes may be indicated by the terms starch, dextrin, and sugar.*

When speaking of uric acid crystals in the urine, I pointed out how these were caused by an excess of free acid in the urine, which, reacting on the urate of ammonia, combined with the ammonia, and liberated the uric acid. I have carefully watched some of these cases of excessive acidity of the urine; and I am led to think that there is a peculiar disease, which shows itself by free acid constantly passing off in the urine; and that this disease is nearly related to diabetes. The existence of free acid in the urine, and the existence of sugar in the urine, are both results of one cause—the arrest of the chemical changes which, in the state of health, take place in the human body. The changes proceed further in the disease which is characterized by excessive acidity, than in that characterized by sugar in the urine. Thus, in excessive acidity,

* Though the greater part of the sugar in the urine comes from the starch taken as food, yet the following facts indicate that there is probably another cause also in action in this disease :—

1st. When diabetes is fully established, total abstinence from starch and sugar will not entirely stop the appearance of sugar in the urine, although by this means the amount of sugar may be very greatly diminished.

2nd. In the milk of carnivorous animals, fed exclusively on meat, sugar of milk, from the researches of Dr. Bensch, ('Annalen de Chemie and Pharmacie,' vol. ii. p. 221,) is invariably present.

3rd. By boiling with water, the livers of animals fed exclusively on flesh, have furnished positive proof of sugar. This fact has now been confirmed by many observers.

the series of changes may be represented by starch, dextrin, sugar, and vegetable acid.

We may, then, arrange these diseases, and show their relation to the healthy state, and to each other, thus:—

In health, the changes are, starch, dextrin, sugar, vegetable acid, carbonic acid.

In excessive acidity, starch, dextrin, sugar, vegetable acid.

In diabetes, starch, dextrin, sugar.

I have some reason for thinking that other terms will be found—other stages, through which the starch passes in its conversion into carbonic acid and water.

Between dextrin and diabetic sugar another substance has occasionally been met with by good chemists; and as it will add something to the clearness of your view of diabetes, I shall shortly tell you what is known regarding it. You have all probably heard of diabetes insipidus—the term has been applied to all cases in which a large quantity of urine, free from sweet sugar, has been passed. The history of diabetes insipidus will show you how incorrectly this term has been used.

In 1806, M. Dupuytren and Thenard, in the 'Annales de Chemie,' vol. lix. p. 41, had a patient making a large quantity of urine, feebly acid, slightly sweet, of somewhat saline taste, which, on evaporation, left granules that had scarcely any sweetness. It was concluded that this granular substance contained only a small quantity of sugar. Nitric acid, alcohol, and yeast, had, however, the same action on this substance as on sugar. The conclusion, therefore, was, that though much less sweet than sugar, yet in some way this granular substance was identical with sugar. The patient was kept from all vegetable food, and he was dismissed cured, but he relapsed, the diabetes re-appearing with other diseases, and he died.

Thenard says, in his 'Chemistry,' of this same case, vol. iii. p. 177, edit. 1818: 'I have had occasion to extract from the urine of a diabetic patient of M. Dupuytren's fifteen killogrammes (thirty-three pounds) of the nearly tasteless sugar, so little sweet that it might be taken for a kind of gum. It dissolved in water; and when in contact with yeast, ferments as well as the other kind of diabetic sugar does; whence it is evidently a kind of sugar, though a distinct species.'

Bourchardat in the 'Revue Médicale,' June, 1839, writes thus:—

"The division into insipid and sweet diabetes I adopt, without attaching the least importance to it, because the urine of the same patient may contain successively tasteless and sweet sugar. I have examined the urine in three cases which contained tasteless sugar. They presented in a very slight degree, the symptoms of diabetes. Thirst, appetite, and quantity of water, were moderate. If the urine is evaporated over a fire, a black extractive matter, without any of the external characters of sugar, remains; but at a lower temperature (140° F.) a clear liquid is obtained, which, at 68° F. gives crystals of tasteless sugar, capable of undergoing alcoholic fermentation."

He continues,—

"At the commencement of my researches I thought that diabetic urine contained very rarely this variety of crystalline tasteless sugar, but

nothing is more common. Most patients with sweet diabetes, who live on animal or vegetable diet, pass urine which contains this tasteless sugar. It crystallizes exactly like grape sugar. It differs only in its taste, which is perfectly insipid, not only when crystallized, but when in solution; when fermented it gives the same quantity of carbonic acid and alcohol as grape sugar. Alkalies have the same action on it as on grape sugar, blackening it. Acids, when cold, effect no change in it, but if boiled for ten hours in water, acidulated with one-tenth of sulphuric acid, this insipid is changed into sweet sugar, which can be crystallized. The composition is the same as that of sweet diabetic sugar. The insipid and the sweet sugar are two isomeric bodies. I will elsewhere give the details of the analyses.

"It a curious fact, that this intermediate body, which resembles dextrin in its insipity and property of becoming sweet when boiled with acids, and which differs from dextrin in its crystallization and solubility in alcohol, and in immediately being capable of undergoing alcoholic fermentation, is a substance which we cannot prepare in the laboratory, and which hitherto has been only made under the influence of organization, in this resembling most closely milk sugar."

Dr. Simon says, (p. 454, German edition), "I once had an opportunity of seeing such sugar in the urine. A young woman with diabetes, eight weeks before her death, was passing a large quantity of very saccharine urine, specific gravity = 1032. The sugar, when separated, had all the properties of grape sugar. She became much weaker, and two days before her death, the urine, specific gravity = 1021, was again sent for examination, and I was not a little astonished to find a perfectly tasteless sugar, soluble in hot alcohol; there was mixed with it a considerable quantity of a substance more like gum, which was insoluble in alcohol, and when heated had a peculiar smell."

I have given these details, partly that you may have a clear idea of diabetes insipidus, but still more because it is probable that, by the re-investigation of this insipid sugar, something will be added to the true theory of diabetes. In insipidity this insipid sugar resembles sugar of milk; it differs from it in not giving rise to mucic acid, and in undergoing fermentation. The conversion of the insipid sugar into grape sugar, by the effect of acids, indicates its place in the series of sugars, and it makes it probable that starch, in its passage through the system, undergoes this change also, and thus the whole series at present known will be, starch, dextrin, insipid sugar, sweet sugar, vegetable acid, carbonic acid.

After this account of diabetes insipidus, you will never consider cases of excess of urine as cases of this disease unless you have reason for thinking that tasteless sugar is present. Cases of excess of urine without sugar are well named cases of diuresis. They for the most part are produced by excess of liquid being taken—that is, by excessive thirst. M. Becquerel has given us the term of polydipsia. The urine is of very low specific gravity, containing neither insipid nor sweet sugar, not unfrequently containing a small quantity of albumen. The excessive thirst may be caused by excessive dryness of the back of the pharynx, and such cases generally end in extreme emaciation and phthisis. The

quantity and specific gravity of the urine immediately determine whether the case is one of diuresis. The symptom of excessive thirst with urine of low specific gravity constitutes the case one of polydipsia.

Torulæ are by no means diagnostic of saccharine urine; but though they form very soon and very plentifully in diabetic urine, yet they may constantly be found in urine which contains no trace of sugar; and though they may lead you to look for sugar, they must never lead you to assert that sugar is certainly present in the urine in which they occur.

A few words regarding the treatment of cases of diabetes.

Why, in diabetes, does the sugar in the blood not pass into the state of vegetable acid, and so on to carbonic acid and water? Why in health does the sugar in the blood rapidly undergo these changes? Our knowledge of the chemistry of the animal system is not sufficient to give as yet any complete answer to these questions. That the alkali in the blood is one of the agents in effecting this change is most probable. The relation of diabetes to acidity points also to the want of alkali. The probable benefit of ammonia and alkaline phosphate of soda lead to the same conjecture. The tendency of the disease being to emaciation and phthisis, gives us at present the best indication for rational treatment.

[Dr. Jones relates the case of a man with diabetes, who was treated with cod-liver oil. He began with half an ounce of the oil and five drops of liquor ammoniæ thrice daily; and the quantity was increased until he took eight ounces of oil and one drachm of liquor ammoniæ daily. When the patient left the hospital his urine was diminished one-half, and its specific gravity one fourth.]—*Lancet, March* 23, 1850, *p.* 349.

71.—*New Test for Sugar in Liquids.*—M. E. Maumene (of Rheims) transmitted a notice of a test tissue, which serves to detect the presence of sugar in liquids. Chlorine, the author observes, contrary to the assertion of Liebig, acts on sugar at a temperature of 212° Fah., and even in the cold after a long period. A brown substance, partly soluble in water, is produced by its dehydrating power. The chlorides, *e. g.* chloride of tin, bichloride of mercury, chloride of antimony, by their affinity for water, possess this property in a still greater degree.

A strip of any kind of tissue that is not acted upon by chloride of tin,—*e. g.* white merino—is to be saturated with a strong solution of this salt, and then dried. Thus prepared, the tissue forms a convenient test of the presence of sugar in any liquid. A few drops of a very dilute saccharine fluid placed on the merino, and exposed to a temperature of from 260° to 300° Fahr., will immediately produce a dark brown or black spot.

By the help of this test the presence of sugar in the urine can be readily detected. Ten drops of diabetic urine, the author stated, diffused in half a pint of water, would in this way yield a brownish black spot. Ordinary urine, urea, and uric acid, produce no result of this kind.—*Med. Gazette, April* 5, 1850, *p.* 604.

72.—*On the Detection of Albumen in the Urine.* By Dr. H. Bence Jones, F.R.S.—In health, albumen is not a constituent of the urine. Healthy urine, when boiled, never gives a precipitate that is insoluble in a drop or two of nitric acid. I have no doubt that very many of the statements regarding the presence of albumen after food, and in the convalescence from severe diseases, arose from the first half of the test—that is, the effect of heat—being alone employed. The time when the urine is most alkaline, and the earthy phosphates most apt to be precipitated by heat, is after indigestible food, or when the stomach is weak and irritable during convalescence. Up to the time, and even at the commencement, of Dr. Bright's researches, heat alone was used as the test of albumen; and Dr. Owen Rees tells me that heat and acid together were first employed by him when making experiments for Dr. Bright.

Albumen is much more soluble in hydrochloric than in nitric acid, and on this account I always prefer the latter acid. Nitric acid without heat is a very delicate test for albumen, and if nitric acid never precipitated anything else, or if albuminous urine were only a solution of albumen in distilled water, nitric acid alone would be a sufficient test; but there are other substances in urine which may be precipitated by nitric acid besides albumen. There may be urate of ammonia, and even urea, present in excess, and the addition of nitric acid may throw down a precipitate of urate of ammonia, or nitrate of urea, and the eye alone cannot, without some practice, see the difference between a precipitate of urate of ammonia, nitrate of urea, and a precipitate of albumen and nitric acid. After precipitation by nitric acid, the effect of heat on the precipitates is very different; the urate of ammonia and nitrate of urea are soluble by heat; the nitrate of albumen in dilute nitric acid, is insoluble when heated; other substances—cubebs, for example, are said to give a precipitate with nitric acid alone. Hence the fallacy of the nitric acid test alone, is, that it may give a precipitate when albumen is absent. I know only of one case in which it gives no precipitate when an albuminous substance is present, and this is not likely to occur. Hence you may take as a rule—if nitric acid gives no precipitate, little or no albumen can be present. I therefore, for quickness, generally try nitric acid first. If no precipitate falls, or forms on standing for a few seconds, I decide against the presence of albumen. If there be a precipitate, I boil the same specimen of urine. If the precipitate be permanent on boiling, I consider the presence of albumen highly probable. Before I decide, I clean the tube, and boil the urine first, and then add a drop or two of nitric acid. The object of cleaning the tube is, to free it perfectly from acid, for a small quantity of acid hinders the coagulation of albumen by heat. Here, as you see, is some urine which coagulates on the addition of heat and acid; on throwing this out of the tube, and adding some more of this urine, without cleaning the tube, you will see that the small quantity of nitric acid which remains will hinder the coagulation of the urine by heat. And now, if I boil the urine no precipitation occurs. I have many times known an unclean test-tube, containing merely a trace of strong acid, lead to the assertion that urine contained no albumen, when a very considerable quantity really was present. The urine

of a patient in St. George's Hospital was highly acid, and gave a precipitate with nitric acid, which was not re-dissolved when heated. This urine would not coagulate with heat alone. I thence concluded that the precipitate with nitric acid was not albumen, nor was it until many months afterwards that I found that very acid urine might contain albumen, and yet not coagulate with heat alone. (See a paper in the 'Medical Gazette' for Nov. 13, 1840, On some Properties of a Combination of Albumen with Acids.) A very small quantity of acid is quite sufficient to stop the appearance of all evidence of albumen, for the compound of the albumen with the acid is soluble in cold and boiling water, though it is quite insoluble in cold or boiling dilute acid. The addition of the acid after the urine is boiled, is sure to prevent the albumen from being overlooked. Alkaline urine also, as well as very acid albuminous urine, will not coagulate by heat, for alkalies, volatile or fixed, hinder the coagulation of albumen by heat.

Instead of filling the test-tube with urine, it is well to take about a drachm of urine, filtered, if it be not previously quite clear—that is, if any cloudiness at all is perceptible, the urine ought to be first filtered; then the clear liquid should be boiled for a minute, and afterwards two drops of nitric acid should be added.

If a very great excess of nitric acid is added, (and frequently a volume of nitric acid is added, equal to the bulk of urine), then the albumen may be re-dissolved, and perhaps this happens more readily if an excess of common salt or other chloride is present, but this solution, in strong acid, is rendered cloudy by the addition of distilled water.

Other tests have been mentioned. A beautiful one is the purple colour that albumen forms with sulphate of copper and liquor potassæ. Gelatine, however, gives the same colour.

Very strong hydrochloric acid gives a most beautiful blue colour, with dry albuminous substances.

A very delicate test is ferrocyanide of potassium, after the urine has been made acid with acetic acid.

The evaporation of a drop of urine on a slip of glass, placed on a water-bath, is also a ready means of detecting the presence of albumen. If any albumen is present, on perfect evaporation, it adheres so firmly to the glass that it is by no means easy to clean it. This evaporation may also be effected in a watch-glass, over a spirit-lamp, in a few seconds, care being taken to hinder the urine from boiling, by holding it far from the flame.

If, by these, or any of them, we satisfy ourselves that albumen exists in the urine, what does it indicate?

The answer to this question is, that, by itself, albumen in the urine indicates only excessive congestion of some part of the urinary organs; but albumen rarely, if ever, occurs in the urine, without some other substance being also present, by which we may determine the cause of the presence of the albumen.

Blood-globules, fibrin, or pus-globules, are the three substances, one or other of which usually are present with the albumen, and by which the cause of its presence may, with tolerable certainty, be conjectured. The quantity of albumen is of less importance than the quality of the substances which accompany it.

Having made sure of the presence of the albumen, by chemical means, the miscroscope is absolutely necessary for determining whether blood-globules, fibrin, or pus-globules are also to be found.

The urine, in a phial, should be left at rest for twelve hours. If many blood-globules are present, a remarkably distinct red line of globules will form at the bottom of the bottle. Thus, sometimes blood may be seen, which could not otherwise be recognised. If but very few blood-globules are present, the eye will not perceive them, unless a drop of the deposit is examined by the miscroscope. It very rarely happens that blood-globules are found by the microscope, when no albumen can be detected by heat or acid. This arises, sometimes, from the solution of the albumen being excessively dilute; so that evaporation in vacuo over sulphuric acid is requisite to get a concentrated solution, which then will give a precipitate with heat and acid. Still more rarely, the blood-globules may be washed out of some small coagulum, long after all the more soluble albumen has been removed,—just as in the washing the clot from blood, the albuminous fluid is first and quickly removed; and long after the albumen is entirely gone, some blood-globules will still be capable of separation by further washing.

The fibrin can be seen solely by the microscope. If it be moulded into the urinary ducts of the kidney, and if albumen is also present, with or without blood-globules, you may be quite certain that there must be congestion of the cortical structure of the kidneys, and most probably the disease is Bright's disease, or the result of scarlet fever. The history and accompanying symptoms enable you to perfect your diagnosis.

If blood-globules are found, and no fibrinous casts, it is most probable that the congestion is not in the secreting structure of the kidney; and if crystals of uric acid or oxalate of lime are seen, then probably some calculus is causing abrasion of the vessels of the mucous membrane. Whether the calculus is in the pelvis of the kidney, the ureter, the bladder, or prostate, must be determined by the general symptoms. The nature of the epithelium that occurs in the urine will also sometimes help to determine this question. The occurrence of the blood only on exertion, tends to confirm the diagnosis of a calculus.

If pus-globules are found with albumen, you may be certain that suppurative inflammation is going on; if, at the same time, fibrinous moulds are seen, then probably Bright's disease and inflammation of the pelvis co-exist. If there are no moulds, but blood-globules and pus-globules, than probably a calculus has caused, not only abrasion, but inflammation, of the mucous membrane. If fibrinous moulds, blood-globules, pus-globules, albumen, and crystalline deposit, are seen, then degeneration of the kidney, inflammation, and calculus, have been found on post-mortem examination.

But you will say, how can we distinguish pus from mucous globules? The appearance of well-formed pus and mucous globules is very different: in pus-globules active nuclei are almost always to be found—that is, young pus-cells growing within the old ones. Mucus does not thus multiply; the cell is slightly granular only. With mucus, exudation globules do not occur; with pus, they are constantly found.

Ropiness with alkalies is not peculiar to pus, but mucus is very rarely present in sufficient quantity to admit of this action of alkalies.

Pus-globules also appear to have a higher specific gravity than mucous globules; on standing in a phial with urine the pus falls in a distinctly bounded sediment; the mucus forms a cloudiness, with much less defined border.

These are the best diagnostic marks I can give you; constant practice in looking at such sediments will be of great assistance; but even to the most practised eye slight alterations of the pus and mucus will hinder you, in some rare cases, from being perfectly certain which you are looking at, but by watching the urine made on different days for a short time you will not long be in doubt. If no trace of albumen is present, the globules must be mucus, and cannot be pus; for pus consists of cells in an albuminous fluid. The quantity of albuminous fluid may be very small indeed, and the number of cells may be very great, but if pus be present there must always be a trace of albumen detectible, on careful examination. The quantity of albumen will vary with the intensity of the inflammation, that is, with the degree of congestion that is present.

The determination of the presence or absence of albumen in the urine is of the greatest importance, because if it be not found, neither fibrin, pus, nor blood, can as a general rule, be present. Thus, by determining the absence of the albumen, we may infer the absence of blood-globules, fibrin, and pus, and we may conclude that neither Bright's disease, calculus, nor inflammatory action in the mucous membrane is present; but when the presence of albumen is determined, no deduction can safely be drawn from this fact, until the further question is answered, as to the presence of the fibrin, blood, or pus. By these, the meaning of the albumen can be known with tolerable certainty, and the treatment must, in great measure, be determined by the conclusions we thus arrive at, regarding the presence of disorganization, mechanical abrasion, or inflammation.—*Lancet, March* 16, 1850, *p.* 323.

72.—*On an Optical Test for Albumen in Fluids.*—Biot was the first to discover the property possessed by albumen, of rotating the plane of polarization of a ray of light transmitted through its solutions, and to ascertain that the degree of angular deviation was proportionate to the concentration of the solution. Bouchardat, after a few experiments upon the albumen of the egg, and one trial of human serum, calculated the molecular rotatory power of albumen at 27° 42′. He was prevented from extending his researches by the imperfection of the polariscope which he used, as it did not permit a polarized ray of the requisite colour, or of sufficient intensity, to be passed through a thick stratum of serum.

M. Becquerel has made observations upon serum, and other albuminous fluids, by means of a modification of the apparatus recommended by Biot and Mitscherlich.

A ray of light, polarized by means of a Nicol's prism, is transmitted through the axis of a tube, of nearly eight inches (twenty centimetres)

in length, terminated at each end by a flat plate of glass, and capable of holding the fluid under examination. Between the tube and the observer's eye is interposed a prism of Iceland spar, cut, however, so as to transmit a *single* image. This prism is situated in the axis of a graduated circle, round which it can be rotated, and from which the degree of rotation may be read off with great exactness. These are the essential parts of the polariscope. In using it, the analysing prism must first be rotated till no trace of the polarized beam is transmitted to the eye. If now the tube be filled with an albuminous fluid, it will be found that light is transmitted, and that, in order to obscure the image, the analysing prism must be further rotated to the right or left. The angle described by the additional rotation of the prism is then read off upon the scale.

In examining serum, and other organic fluids, M. Becquerel has, *by direct chemical analysis, confirmed the indications of the optical test*, and has constructed a table, indicating, for each *minute* of deviation, the corresponding amount of albumen.

He concludes —1. That the albumen held in solution by serum and other organic fluids causes the plane of polarization of a transmitted ray to deviate to the *left*.

2. That the degree of deviation is proportionate to the amount of albumen contained in each liquid, and that, by means of the angle, the amount of albumen may be directly calculated.

3. That the "molecular rotative power" for albumen is about 27° 36′; and that, in examining a fluid, each *minute* of rotation may be held equivalent to ·18 parts of albumen per 1000.

4. The possible error of observation does not exceed four or five *minutes*, and hence cannot affect the calculated result by more than ·1 per 100—a degree of accuracy which can be attained by no known mode of analysing albuminous fluids.

Becquerel, who has applied this new optical test to more than 150 specimens of serum from the blood, and to 50 pathological fluids, has never met with an instance in which it contradicted the results of direct chemical analysis. We need hardly say, that a test of such delicacy would be a most welcome addition to our present rather imperfect means of examining morbid fluids for albumen, were we assured that no other substance could interfere with its indications. In the progress of Bright's disease, it is of great importance to watch, from time to time, the amount of albumen contained in the urine. Hitherto we are not aware that any more accurate test has been applied, than that commonly employed by Dr. Christison—viz., to estimate the amount of albumen by the depth which it occupies in the tube in which it is heated. The test proposed by Becquerel would be quite as easily applied, and, if other substances met with in urine do not possess optical properties analogous to those of albumen, would afford far more satisfactory results. The apparatus requisite for the repetition of Becquerel's experiments is difficult of construction, and consequently, expensive. Those who may chance to possess it, and wish to investigate the subject, will do well to study the mode of manipulation described in the 'Gazette Médicale.'

The *polariscope* in four cases, indicated an average deviation of 5° 21′—*i. e.* 57·78 per 1000.—*Monthly Journal, Jan.*, 1850, *p.* 65.

73.—ON THE USE OF GALLIC ACID IN ALBUMINURIA.

By G. Sampson, Esq., late Surgeon to the Salisbury General Infirmary; and John Lyell, Esq., Newburgh, Fife.

[Mr. Sampson has seen so great benefit arise from the use of gallic acid in cases of albuminous urine, that he calls the attention of the profession to the subject, with the view of obtaining for this medicine a more extensive trial. Out of four cases related by Mr. Sampson, it will be sufficient to lay before our readers the first, which was that of an elderly gentleman who laboured under frequent and painful micturition, and other symptoms of prostatic disease, and whose urine was of low specific gravity, (1·011 to 1·013) and contained a large quantity of albumen. Mr. Sampson tells us:]

The first remedy which I suggested was a suppository of opium and hemlock. This was used for a fortnight or three weeks with some relief of pain, but with no other benefit, and it then occurred to me that as gallic acid has the property of speedily arresting the escape of blood corpuscles in hæmorrhage from various structures, it possibly might, if given in large and frequently-repeated doses, check the loss of albumen from the blood through the kidneys.

Accordingly, on the 14th of May, I recommended him to take ten grains of gallic acid in infusion of orange peel every six hours. This he continued to do till the 3rd of June, by which time the specific gravity of the urine had increased to 1·017 in the morning, and 1·019 in the evening; it had also become moderately acid, and decidedly less albuminous. The bladder was also so much less irritable that the patient could retain his water for a period of four and even five hours; the pain had greatly diminished, he felt stronger, and his appetite had improved. The acid, for some reason, was then omitted for eight or ten days, but the pain again increased, although the quantity of opium in the suppository had been augmented. The patient was therefore requested to resume the acid, which he did, and persevered in taking it until the middle of August, during which time his symptoms progressively improved, and he declared that he felt himself well. At that time the urine was acid, of a deep straw colour, with only the faintest possible trace of albumen, and its specific gravity was 1·019 in the morning, and 1·020 in the evening. Circumstances prevented my seeing this patient again till very recently, when I learnt that he had suffered from a severe attack of diarrhœa, which had reduced his strength, and brought back many of his old symptoms. The urine, however, even under this disadvantage, is, at the time I write, less albuminous than when I saw him first, and I confidently expect he will quickly improve again under the use of the gallic acid.

[Mr. Sampson has also given gallic acid with success in a case of gonorrhœa of eight days' standing. The dose was twelve grains, five times in the twenty-four hours.]—*Lancet, Dec.* 1, 1849, *p.* 577.

[Mr. J. Lyell, of Newburgh, Fife, states that he has used gallic acid in cases of albuminuria for upwards of three years, and generally with

the best effects. He gives the following case as illustrative of his practice:]

Mrs. A., a married elderly lady, consulted me on Sept. 16, 1846. She had for some time been in delicate health, but several of her relations having died dropsical, she only got alarmed about herself on the appear- of swelling in the feet and ankles. She had a dirty, sallow complexion; her eyelids were puffy; her feet and legs œdematous; and, indeed, anasarca to a certain extent was apparent over the whole of the body. Examination of the thoracic and abdominal viscera elicited nothing abnormal; the kidneys alone seemed to be at fault; there was dull pain in the lumbar region, particularly on pressure; the urine was scanty, diminished in specific gravity, and albuminous to one-fifth. After using the warm bath, and counter-irritation over the loins, the patient was put under the use of gallic acid, taking about twenty-five grains daily in divided doses. Speedily, on testing with iron, the acid was found in the urine, and steadily the albumen began to diminish. In ten days, after using about six drachms of acid, every trace of albumen had disappeared. There was still, however, slight anasarca present, to remove which, and expedite the cure, infusion of digitalis was prescribed; this, and a subsequent gentle tonic (colomba), removed every ailment. The patient has remained well ever since, being now upwards of three years ago.

This, and several other cases of a similar description, I laid before Prof. Christison, in my correspondence with that eminent physician, who immediately subjected the acid to a trial, and brought the matter under the notice of his clinical class. This will be seen by referring to 'Gallic Acid' in the last edition of his 'Dispensatory,' second edition, 1848. I thought of publishing a few cases on the use of the acid at the time when first used, but, under the advice of the professor, I refrained till experience of its benefits had been more matured. The independent evidence of Mr. Sampson certainly says something in its favour. Since the writings of Dr. Bright appeared, the pathological conditions of the kidney inducing albuminuria have been much elucidated by the researches of Gluge, Simon, Prout, &c.; yet, however much our knowledge has increased in this respect, our powers of distinctional diagnosis have by no means kept pace with it. Hence the acknowledged difficulty in any given case to predicate the true *origo mali*—whether the organ may simply be congested, inflamed, choked up in the tubes, or in a *sui generis* state palpable to the knife and microscope, but hard to associate with a well-defined set of symptoms during life,—or whether, in fact, the kidney be at fault at all, and the evil rather dependent on the quality of the blood, as a few pathologists, in some instances, believe to be the case. It is true, that the use of gallic acid in albuminuria savours somewhat of empiricism, yet, with all our boasted knowledge, how often are we forced to be empirical in our treatment of disease. I have now used it in very many cases of albuminous urine, often, though not uniformly, with decidedly good effects. When it speedily becomes manifest in the secretion, it usually does good; if it fail, after a day or two, to make its appearance there, no benefit can be expected, and it should be given up. In the albuminuria consecutive to scarlatina I have scarcely ever used

it; counter-irritation, the warm bath, with infusion of digitalis and broom, never fail once in twenty cases to relieve these sequelæ.

I believe, that in most cases of albuminuria, gallic acid may safely be made trial of as a remedial agent, not neglecting, of course, other obvious measures of relief; it will soon indicate those cases it is disposed to benefit. When our differential diagnosis of kidney disease gets more precise, we may be able to prescribe the acid to its appropriate cases at once; till then, we must cautiously feel our way.—*Lancet, Dec.* 8, 1849, *p.* 608.

74.—ON THE ALKALINE AND EARTHY PHOSPHATES.

By Dr. H. Bence Jones, F.R.S.

[After briefly recapitulating the nature of the salts of phosphoric acid, and stating that the *tribasic* salts alone occur in the human body, Dr. Jones proceeds to say:—]

It is probable that all the three (tribasic) phosphates of soda occur in the blood; if not at the same time, yet at different times and under different circumstances. The common phosphate and the alkaline phosphate certainly exist in the blood; in the urine the acid phosphate and more surely the common phosphate occur. There are earthy phosphates also present in the urine—namely, phosphate of lime and phosphate of magnesia, but the phosphates of soda are almost without exception always present, in much greater quantity than the earthy phosphates. The phosphates of soda are very soluble in water, and in acid or alkaline urine they are held in solution. They never fall as a precipitate, but, like the sulphates of potash, or soda, they may be in excess, and yet not make themselves apparent; we can make them appear, but they also do not show themselves under any circumstances. The lime and magnesia phosphates, on the contrary, are not very soluble in water, and they are nearly insoluble in alkalies, but they are very soluble in acids of any kind, even in acid phosphate of soda. Usually when the earthy phosphates are precipitated from the urine, there remains in solution three or four times as much phosphate of soda. The phosphates of soda in the urine are the most abundant. The earthy phosphates as regards quantity are of much less importance. Hence, as to quantity, if we speak of phosphates in the urine, we ought to limit that term to the alkaline phosphates, and not apply it to the earthy alone, as is at present done. The amount of earthy phosphates precipitated when the urine becomes alkaline, is solely dependent on the amount of the earths present—that is, on the quantity of lime and magnesia passing out of the system. By taking lime-water or magnesia, or by adding these to the urine, we may increase the earthy phosphates; and finally, if we add enough, we may precipitate all the phosphoric acid in combination with these earths, and leave no phosphate of soda in solution. On the contrary, if we could take away all the lime and magnesia, though we had a great excess of phosphate of soda in solution, yet we should have no precipitation on the addition of alkalies, but on adding any lime or mag-

nesia to such alkaline urine, an immediate precipitation of phosphate of lime or phosphate of magnesia would occur.

The general conclusions I come to are these:—

1. That the amount of earthy phosphates depends chiefly on the amount of earthy matter taken into the body.

2. That the amount of alkaline phosphates depends chiefly on the food, but that exercise also causes some increase of these phosphates. These, being soluble in fixed alkalies and in carbonate of ammonia, never fall as a precipitate when the urine becomes alkaline, although the earthy phosphates then become apparent. These last indicate only the quantity of earthy matter in the urine.

In the first edition of Dr. Prout's work, he called the phosphatic diathesis the phosphatic or earthy diathesis. He corrected the earthy for the term alkaline diathesis; and then, in the second edition, he returned to the phosphatic, or earthy diathesis. From my experiments I consider that what Dr. Prout, and all others after him, call the phosphatic diathesis, is, in fact, nothing else than the precipitation of the earthy phosphates, in consequence of the alkalescence of the urine, and I consider that the term alkaline urine is the most fit to be applied thereto.

Urine which is alkaline from carbonate of ammonia, carbonate of soda, carbonate of potash, or phosphate of soda, is not able to dissolve the earthy phosphates, and they therefore fall as a precipitate. This precipitate of the earthy phosphate solely depends on the urine being or becoming alkaline. It will add not a little to the clearness of our view of urinary diseases, if this meaning of the term phosphatic diathesis is entirely given up, and its place supplied by the term alkaline urine; and it will give still more precision, if, when the earthy phosphates are precipitated by carbonate of ammonia, such urine be called ammoniacal urine, and if, when the earthy phosphates are precipitated by fixed alkali, this urine be called alkaline, from fixed alkali. The term phosphoric diathesis, I consider, ought to be used (as the term sulphuric diathesis is) to denote an increase in the total amount of phosphates, alkaline as well as earthy; and this term ought not to be applied to the mere precipitation (it might be of only a very small amount) of the earthy phosphate alone.

The total amount of alkaline and earthy phosphates in the urine never makes itself evident to the eye, for the phosphates of soda never fall as a precipitate. Like the sulphate of potash or soda we never can tell whether there is much or little present in any urine by merely looking at it. The earthy phosphates show exactly how much earthy matter—that is, lime and magnesia—is present, but they are no index whatever to the amount of alkaline phosphates in the urine. I consider, then, for these reasons, that what is now called phosphatic diathesis ought to be called alkaline urine, and the term phosphoric diathesis ought to be applied to an increase in the total amount of alkaline and earthy phosphates, and if limited to one phosphate, it ought to be given to the alkaline phosphate, because there is four or five times less of the earthy than of the alkaline phosphate in the urine; moreover, the term earthy diathesis, if used at all, ought to be given to urine which contains an excess of

lime and magnesia, and not to the precipitation (it may be, of only a small quantity) of these substances in consequence of the urine having lost the property of dissolving them by becoming alkaline.

Alkalescence of the urine and an increase in the total amount of phosphates have no relation of any sort or kind to one another. They are totally distinct; in fact, they are rather opposite states. At least, ammoniacal urine generally contains only a small quantity of alkaline and earthy phosphates, and urine, which contains a great excess of alkaline and earthy phosphates, is generally highly acid, and remains so without undergoing decomposition above the average time.

As in the sulphuric diathesis, so in the true phosphoric, some method must be employed to cause the precipitation of all the phosphates. The addition of chloride of calcium, and ammonia, free from carbonate, is generally sufficiently accurate for the purposes of comparison. No judgment by the eye of the quantity of precipitate can with safety be relied upon; for quantities we must trust only to the balance. Where it is a question of quality, as of the presence or absence of albumen or sugar, the eye may be trusted; but for quantities, the eye alone will lead to great mistakes.

After a long inquiry into the total amount of phosphates in various diseases, the conclusions at which I have arrived are these. The details of the cases which led to these conclusions are given in 'The Lancet' for 1847.

1. The variations of the earthy phosphates are so dependent on the earthy matter (lime and magnesia) present in the urine, that no deduction from them as to the nature or state of the disease is possible.

2. Neither the earthy phosphates nor the alkaline phosphates are permanently increased in spinal diseases.

3. In fevers and acute inflammations of fibrous, muscular, or cartilaginous tissues, the total amount of earthy and alkaline phosphates is not increased.

4. In chronic diseases in which the nervous tissue is not affected, no deduction can be drawn.

5. Chronic cases of mania, melancholia, and general paralysis of the insane, gave no marked results.

6. In chronic diseases of the brain, and in chronic and even acute disease of the membranes, there is no increase in the total amount of earthy and alkaline phosphates.

7. In fractures of the skull, when any inflammation of the brain comes on, there is an increase of the total amount of phosphates. When there are no head symptoms, no increase of the phosphates is observed, even when other acute inflammations supervene.

8. In acute inflammation of the brain there is an excessive amount of phosphates in the urine. When the inflammation becomes chronic, no excess of phosphates appears in the urine.

9. In some functional diseases of the brain an excessive amount of phosphates is observable; this ceases with the delirium. Delirium tremens shows a remarkable deficiency in the amount of phosphates excreted, provided no food is taken. When food can be taken, the diminution is not apparent.

As regards the treatment of cases, in which an excess of alkaline and

earthy phosphates exists in the urine, very little is to be said. The excess of phosphates is the result of the disease, and not its cause. Stop the disease, and you lessen the phosphates: it by no means follows that you would produce the smallest effect on the disease, if you could lessen the excretion of the phosphates. The excess of phosphates in the urine may lead you to a right diagnosis, but to consider that the increase of the phosphates in the urine constitutes the disease will only mislead you from the treatment of the real complaint.

As regards the treatment of those cases in which the earthy phosphates are precipitated alone from the urine, it resolves itself simply into the means of keeping the urine acid—that is, of hindering the urine from becoming alkaline, whether from fixed alkali or from carbonate of ammonia.—*Lancet, March* 2, 1850, *p.* 259.

75.—*On the Relation of the Urine to the Food and to the System: and on the General Method of Examining the Urine.* By Dr. H. Bence Jones, F.R.S.—[Dr. Jones commences the discussion of this subject by showing that the urine contains the same four classes of substances as does the food, viz., water, nitrogenized substances, non-nitrogenized substances, and ashes. He then proceeds to say:]

The kidneys are not to form urine, but to separate from the blood substances that are useless or hurtful to the system. Any organ that is used must be repaired, and the substance that has been used must be removed. Take the muscles, for example; the muscles consist of water, salts, non-nitrogenous fat, and a highly compound arrangement of carbon, hydrogen, nitrogen, oxygen, sulphur, and phosphorus. Carbonic acid, ammonia, water, sulphates, and phosphates are the last products of muscular action, and of the action of oxygen on the muscle. The intervening products probably are innumerable, as kreatine, kreatinine, uric acid, urea, choleic acid. Some of the products are thrown out of the body by the lungs, others by the kidneys. If the removal of some of these products by the lungs is stopped, the circulation through the lungs ceases in two minutes; the heart and brain are stopped, and from the mechanical stoppage in the lungs, death ensues. If the removal of these products by the kidneys is stopped, in two days the patient is poisoned; the nerve and muscle are affected by the poison, and chemical death ensues.

If beef-steaks (the muscles of an ox) are given to one who has taken strong exercise, and is in perfect health, they are dissolved, pass into the blood, and their chief use is to repair the muscles and nerves, not to form uric acid and urea, and the constituents of the urine. The waste of the muscles and other organs passes off in the urine, whilst the food nourishes the wasting organs. Such I conceive to be the clearest ideas I can give you of the relation of the urine to the system and to the food, and theoretically I consider this as the true healthy relation, and perhaps in a state of full bodily labour, when enough food, and no more food than enough, is taken, this may be the only relation; but provision has been made for too little labour and for too much food. If too much food is constantly taken, and too little exercise, plethora and hemorrhage must take place, if some escape for the excess of food be not provided. You

have seen that the phosphates, sulphates, and urates are generally increased in the urine after food has been taken. If more food is taken than is required for the wants of the system, the excess is thrown out by the same organs that remove the waste of the muscles and other structures. If even excess of water alone is taken, the excess is thrown out partly, at least, by endosmotic laws not yet clearly applied. How the quantity of substances to be thrown out is determined, I do not yet distinctly see. As far as I can understand, it only adds to the difficulty, to say that the unvitalized portion of the food or water is thrown out, whilst that portion which is vitalized remains in the blood. When and why uric acid is formed directly from the food seem to me questions more likely to be solved by keeping them distinct from questions of vitalization. Long ago, Dr. Prout most fully recognized the fact, that the food not only nourishes the body, but, when excess of it is taken, passes off in part in the urine. That this double relation of the urine exists, I have also proved to myself in opposition to the theories I had formed. The facts, then, are these—food makes blood; blood makes muscle; this when used returns in a different form into the blood again, and passes out by the breath and urine. This is the first most healthy systemic or larger circle. The second less healthy relation is caused by excess of food or diminished wants of the system. The circle is smaller. The excess passes into the blood from the stomach, and passes out by the breath and urine.

The relation of the urine to the respiration—that is, to the inhalation of oxygen and the expiration of carbonic acid, must be also considered, in order to attain to any clearness of conception as to the nature of the excretion. If the discovery of the circulation of the blood is still considered as exercising the first influence on physiology and pathology—if the establishment of this principle is thought to have added more to our knowledge than any other fact previously known—if this be considered as one grand vital action of the human body, then I am sure that the grand chemical principle, the action of oxygen in the body, will, before any great length of time, be regarded as of equal importance. I will not attempt to compare these actions—indeed, they admit of no comparison; they are related, and dependent on each other; they probably cannot even exist separately. The muscle would not contract without the chemical action of oxygen; the oxygen would not reach the muscle without the contractile action of other muscles assisting it in circulating it in the blood. There is no spot to which the oxygen does not reach. In the capillaries, in the minute texture of the various organs, the oxygen exercises its power of combining with hydrogen and carbon, giving warmth, and forming compounds, which pass out of the body chiefly by the lungs, the skin, and the urine. In the capillaries of the kidney, as in other capillaries, oxidation is rapid, and the products of oxidation appear in the urine and other excretions. The colour of the urine, the arrangement of the elements of the effete compounds, perhaps even the acidity, depend on the action of oxygen, though it is possible, as regards the acidity, that in the minute texture of the kidney, an action similar to that in the stomach, which causes the liberation of acid there, may take place.

An example of the action of oxygen in the system is seen in the effects

of saline draughts on the urine. The ordinary action of such medicines is, to lessen the acidity of the urine. How is this effected? We have taken some vegetable salt of potash: it passes off in part by the kidney, in the form of carbonate of potash. What has taken place in its passage? Some say the salt is changed in the stomach; that it is there that oxidation occurs, and that carbonate of potash is formed. But if the salt is injected into the veins (as in some experiments by Dr. H. Hoffman) the same result ensues, and thence it is evident that the oxidation may occur in the blood, and not in the stomach. If tartrate or citrate of potash are burnt, carbonate of potash and water result, and the same happens when tartrate or citrate of potash are taken into the system.

Very lately, Prof. H. Rose, of Berlin, ('Philosophical Magazine,' July, 1849), has made some most interesting experiments on the inorganic constituents of organic bodies, chiefly as regards their degree of oxidation. He divides the degrees of oxidation into fully oxidized, partially oxidized, and unoxidized. He compares the food, the blood, the flesh, and the urine. The food, if it consists of wheat and other grain, consists of organic substances, the inorganic constituents of which exist partly in an oxidized, partly in an unoxidized state. Vegetable food then, is partially oxidized. The blood is a partially oxidized body. The flesh is a partially oxidized body, but the quantity of unoxidized matter in the blood is larger than in the flesh, and the quantity of fully oxidized matter is smaller in the blood than in the flesh. The urine is a perfect and fully oxidized substance. The inorganic constituents of the urine are as highly oxidized as it is possible for them to be.

Independently of these examples or proofs of the action of oxygen in the system, I do not think we could see oxygen going in with each inspiration, and carbonic acid coming out with each expiration, without believing that oxygen is continually working great changes in the body. I believe it will be proved, that when there is much change going on in the muscles or nerves, the effect of such changes will be found in the increase of certain combinations of oxygen in the urine. Thus increased action of the nervous system will show itself by the increased amount of the compounds of oxygen and phosphorus; phosphoric acid, combined with alkalies, will be found in excess. And when there is increased muscular action, the compounds of sulphur and oxygen will abound; sulphuric acid will appear in the urine in greater quantity than usual. When there is but little action of oxygen on these tissues, there will be a smaller quantity than natural of these substances in the urine. Such, then, is the best general view I can give you of the relations of the urine to the organs of the body, to the food, and to the respiration.

The urine in disease is not only affected by all these causes of variation, but many diseases—perhaps all diseases—have a peculiar effect of addition or subtraction on the urine. In many diseases, as in diabetes and albuminuria, this effect can be discovered, and we can thereby recognise the disease. Not only diseases of the kidney, but diseases of other organs, or of the whole system, delirium tremens, or inflammation of the brain, fevers, or inflammations, may, by careful examination of the urine, be recognised. In doubtful cases the value of such information may be very great, and as knowledge extends, the examination of the urine will be more generally made, not only in

medical but in surgical cases also. I have known the removal of a doubtful cancer of the lip cause death, which might have been delayed, if not avoided, by examination of the urine. After death it was remembered that the patient had been in the house previously for diabetes, and was thought to be cured, but I examined the water taken from the bladder after death, and found sugar in it.

I have known the simple removal of a pile cause death, where the patient had albuminous urine; and probably, before long, no operation will be undertaken until it is known whether the urine is healthy or not; and also in the prognosis after an accident, the state of the urine is worthy of attention. The number of deaths after operations, at St. George's Hospital, during the last five years—1844 to 1848—was seventy-two cases, independent of lithotomy; and of these, thirteen cases, or near eighteen per cent, had disease of the kidneys. Moreover, the deaths after slight accidents, during those five years, may, in many cases, be traced to disease of the kidneys.

In conclusion, I will rapidly run over the general mode of proceeding in an examination of the urine.

The urine cannot be well seen, unless in a transparent vessel. A six ounce phial, filled with the urine, and sediment if there be any, will be sufficient for every purpose. If possible, the urine as soon as it is passed should be put into the bottle.

The first test to be used is litmus paper. The question you ask is—What is the state as regards acidity—not as to the quality only—but as to the quantity? Is it too much, or too little acid? Litmus-paper cannot fully answer this question. It can tell whether the urine is ammoniacal, or alkaline from fixed alkali, or contains little or much acid, but it cannot tell whether the acidity is more than it should be. Simple inspection of the urine is able to solve this question, and that better than any other mode whatever. There cannot be an excess of free acid in the urine without the uric acid being set free, though this often requires many hours to crystallize out. If, then, you wish to know if the urine is too acid, you must leave the phial at rest for twenty-four, and sometimes ninety-six, hours; and if there be too much acid, red crystals of uric acid will be very distinctly seen adhering to its sides, or deposited. The microscope may tell you quicker, but it will not tell you more surely, than the naked eye. Whatever the degree of reddening of the litmus, or the amount of urate-of-ammonia sediment, you cannot with truth speak positively of excess of acid being present, unless you see uric-acid crystals; and it is only when free acid is present in the urine that alkaline remedies are absolutely necessary.

If the urine is alkaline, heat applied to the litmus-paper will generally tell whether it be from fixed alkali or ammonia. If the former, mineral acids and tonics have the best possible effect; if the latter, inflammation of the mucous membrane is the most probable cause of the change of the urea into carbonate of ammonia.

The microscopic examination of the sediment serves to confirm all these deductions. In the last case, pus-globules and prisms of phosphate of ammonia and magnesia are seen; in the former case, granules of phosphate of lime, and frequently oxalate-of-lime octahedra.

Here, then, a short examination of the urine tells whether there is local inflammatory disease of the mucous membrane of the urinary organs, or whether the general disorder of the system is to be remedied by giving alkalies or acids.

After examining the acidity of the urine, if clear, the specific gravity is next to be taken, either by a urinometer, or by a bottle and balance. If the urine is of low specific gravity, the probability of albumen existing in the urine should be tested. If the urine is of high specific gravity, the existence of sugar should be suspected, and the more so the paler the urine is.

Having determined the specific gravity, a drop of the urine, with the sediment, should then be examined by the microscope. Pus, mucus, blood, fibrinous casts, urate of ammonia, uric acid, oxalate of lime, phosphate of ammonia and magnesia, may or may not be seen to be present. The drop of urine should then be left to dry on the glass for twelve or more hours, and then again examined, and sugar or urea may be then seen: and by the ease or difficulty with which the glass can be cleaned, albumen may be proved to be absent or present. The bottle, also, containing the urine, should, after twelve hours' standing, be again examined. Uric acid, blood, and pus, may then sometimes be more clearly seen by the naked eye. If, from this examination, pus is suspected to be present, the action of liquor potassæ on the sediment should produce ropiness. If fibrinous casts are seen, or adhesive matter forms on the slip of glass, the urine should be filtered and examined for albumen. If sugar is suspected, the sulphate-of-copper test, and the test by boiling with liquor potassæ, should be also tried.

Let me again repeat another example of the knowledge which may be derived from examination of the urine.

Let me ask this question. Is there blood or is there no blood in the urine? If there is, does it proceed from the most frequent disease of the kidney—Bright's disease, or from calculus? The first question, simple inspection of the urine after it has stood in the phial for twelve hours will generally decide. Usually the blood-globules are insoluble in the saline urine, they subside in twelve hours; and though the eye cannot judge with certainty whilst the blood-globules are suspended, it can judge most accurately when they have fallen, and form a layer at the bottom of the glass. For this no microscope is necessary, though it will more quickly decide this question; and without the microscope, the second question, as to the cause of the blood, cannot be solved except by the general symptoms. If fibrinous moulds of the ducts are found by the microscope, with blood, there can be no doubt that the blood is caused by congestion of the cortical structure of the kidney; and if this constantly exists, Bright's disease is present, and the low specific gravity and excess of albumen in the urine will generally help to confirm this deduction; the history of the case always being well considered. If with the blood uric-acid or oxalate-of-lime crystals are found, and the specific gravity is high, and fibrinous moulds are wanting, then most probably a calculus is present in one kidney. Perfect rest will help to confirm or contradict this diagnosis. These instances I might multiply; but these are sufficient to show you the value of examination of the urine for diagnosis and treatment.—*Lancet, March* 30, 1850, *p.* 375.

SURGERY.

FRACTURES AND DISEASES OF BONES, JOINTS, ETC.

76.—ON DISJUNCTION OF THE LOWER EPIPHYSIS OF THE HUMERUS.

By Dr. R. W. Smith, Professor of Surgery in the University of Dublin.

[Dr. Smith is of opinion that this accident has hitherto been confounded with fracture immediately above the condyles, and attributes the mistake to ignorance of the exact line of union of the epiphysis with the shaft of the bone. He says,]

Upon a former occasion, I pointed out the error committed by Vidal (De Cassis), in supposing that the tuberosities of the humerus belonged, not to the epiphysis, but to the shaft of the bone; and showed that there was no difficulty in comprehending the occurrence of osseous union in cases of separation of the superior epiphysis of the humerus, inasmuch as it formed one body with the tuberosities, and was still connected to living tissues.*

I shall now endeavour to demonstrate that a similar error has been committed with respect to the anatomy of the lower epiphysis of the humerus, and that those authors who have written upon the subject of injuries of the elbow-joint have confounded with each other two very different accidents, viz., fracture of the humerus immediately *above* the condyles, and disjunction of the inferior epiphysis of the same bone; they have omitted to describe the diagnostic signs of the latter injury, and the means by which we are to distinguish it from luxation of both bones of the fore-arm backwards at the elbow, evidently from being unacquainted with the simple anatomical fact, *that the lower epiphysis of the humerus does not include the condyles, which belong entirely to the shaft of the bone.*

So complete is this ignorance on the part of M. Malgaigne (who has recently published on the subject of fractures), that he has included separation of the lower epiphysis of the humerus among the *supra-condyloid fractures* of that bone.

Disjunction of the lower epiphysis of the humerus (of which I find no particular mention made either by Boyer or Sir A. Cooper) is an accident

* See Treatise on Fractures, &c., p. 202.

which has hitherto been confounded with fracture immediately *above* the condyles, an error from which it may be inferred, I think, that the exact line of junction of the epiphysis with the shaft of the bone is not generally known to surgeons.

At all events, it is manifest that by the authors from whose writings I have quoted, this line has been supposed to traverse the bone *above* the condyles; whereas the anatomical fact is, *that these processes belong exclusively to the shaft of the bone, and form no portion whatever of the epiphysis, which comprises nothing but the capitulum and the trochlea.* The line which marks its junction with the shaft is directed obliquely downwards and inwards, terminating below and external to the epicondyle, which, in the young subject, is distinct both from the epiphysis and from the shaft.

The lower articular surface of the humerus in the young skeleton differs from that of the adult bone in the following remarkable particular, namely, that the capitulum, or that portion which articulates with the head of the radius, is nearly double the size of the trochlea; so that the inferior surface of the former is nearly upon the same level as that of the latter process; and the humerus, when placed resting by its lower extremity upon a horizontal plane, assumes nearly a vertical position; in short, the radial is fully developed long before the ulnar portion of the epiphysis, and, as will hereafter appear, the knowledge of this fact is not destitute of practical importance in the diagnosis of that embarrassing accident, fracture through the line of junction of the epiphysis with the shaft, or, in other words, fracture of the humerus immediately *below* the condyles.

A description of the signs which characterize this lesion must also be, to a certain extent, an enumeration of those which accompany dislocation of both bones of the fore-arm backwards; many of the symptoms likewise belong to the transverse fracture, immediately *above* the condyles.

The injury usually results from a fall upon the elbow, but I have known it to occur from a fall upon the palm of the hand, the fore-arm being at the time extended upon the arm. The limb immediately becomes powerless, severe pain is experienced in the elbow, and the following signs present themselves:—The fore-arm is flexed, and the hand in a middle position between supination and pronation. The olecranon, drawn upwards and backwards by the triceps muscle, mounts above the level of the condyles of the humerus, these three processes forming the points of a triangle, the base of which is below. The antero-posterior diameter of the elbow is greatly increased, and the lower end of the

humerus can be felt projecting in front. The application of a gentle force is usually sufficient to restore the normal appearances of the limb, but when the parts are abandoned to themselves the deformity soon recurs. If, after the removal of the displacement by extension, the fore-arm be rotated upon the humerus, or if the surgeon, as recommended by Dupuytren, grasps the arm in one hand, and the fore-arm in the other, and then moves them backwards and forwards upon each other, the crepitus which characterizes fracture can generally be elicited. The motions of flexion and extension are exceedingly limited, and any attempt upon the part of the surgeon to communicate them produces severe pain.

The signs above enumerated are sufficient to demonstrate that the injury in question may readily be confounded with transverse fracture of the humerus above the condyles, or with luxation of the fore-arm backwards. The former would be a mistake of comparatively slight importance, inasmuch as the same treatment is applicable to both lesions; but the latter must be considered as a grievous error, the results of which are nearly as lamentable as those of leaving a true luxation of the joint unreduced.

As the loss of the normal relation between the olecranon and the condyles renders the separation of the epiphysis peculiarly liable to be confounded with dislocation of the fore-arm backwards, and as it is obviously a matter of the utmost importance to distinguish carefully between these accidents, let us now consider the signs, by availing ourselves of which we materially diminish the chance of mistaking it either for luxation, or for fracture above the condyles.

In case of fracture traversing the line of the epiphysis, the transverse diameter of the tumour which projects in front is equal to that of the opposite humerus, measured anteriorly from condyle to condyle; in this respect the accident resembles the dislocation of both bones backwards, but differs from fracture *above* the condyles. The outline of this osseous tumour is rounded, presents to the feel none of the irregularities or sharpness of an ordinary fracture, and upon its inferior surface, which is convex, and limited at either extremity by the condyles, neither trochlea nor capitulum can be distinguished.

When the joint is viewed posteriorly, two osseous prominences are seen, and can be distinctly felt; they are both placed above and behind the plane of the condyles, but are themselves situated (if the patient be not more than six or eight years of age) nearly upon the same level, the internal, however, being always a little higher up than the external. At a more advanced age the distance between these two prominences is observed to be greater, in consequence of the increased development of the internal, which is formed by the olecranon, the summit of which process grows by an epiphysis.

At no period of life, however, at which it is possible for the accident in question to happen, is the distance between the two projections nearly as great as it is always found to be between those which, in cases of luxation of both bones of the fore-arm backwards, constitute so marked a feature of the injury. In the latter accident the distance averages about one inch and a half, while in the former it is seldom more than three quarters of an inch; the external tumour, in this case, being formed by

the *capitulum of the humerus*, still surmounting the head of the radius, for which, in consequence of the concave form of its superior surface, it is extremely liable to be mistaken, if attention be not paid to the diagnostic sign which has just been mentioned.

I shall terminate this brief notice of fracture through the line of the lower epiphysis of the humerus, by stating as concisely as possible the points of resemblance and dissimilarity between it and the two injuries with which it is most liable to be confounded, viz., fracture immediately *above* the condyles, and luxation of both bones of the fore-arm backwards.

The symptoms which belong to it in common with fracture above the condyles are the following:—shortening; crepitus; the removal of the deformity by extension, and its tendency to recur when the extending force is relaxed; the presence of an osseous tumour in front of the joint; the increase in the antero-posterior diameter of the elbow.

It differs from the supra-condyloid fracture in the greater transverse breadth and regular convex outline of the anterior tumour; in the existence of two tumours posteriorly; in the loss of the normal relation of the olecranon to the condyles.

It resembles dislocation of both bones of the fore-arm backwards, in the following particulars:

The transverse diameter of the anterior tumour is the same in each case; so also is the antero-posterior breadth of the elbow; and in both the olecranon ascends above the condyles, the limb is shortened, and two osseous prominences can be distinguished posteriorly.

It differs, however, from luxation, in the existence of crepitus, the tendency of the deformity to recur, in the anterior tumour being destitute of trochlea and capitulum, and in the circumstance of the two posterior tumours being nearly upon the same level.—*Dublin Quart. Journal, Feb.* 1850, *p.* 63.

77.—OBSERVATIONS ON RICKETS.

By G. M. Humphry, Esq., Surgeon to Addenbrooke's Hospital, Cambridge.

The true pathology of rickets consists, not in a deficient supply of nutritive material, but in a want of power to appropriate that material, so that the structure remains imperfect, and liable to disease. It is of no use, therefore, to cram the sufferers with various preparations containing the earthy salts, for there is no lack of these in the blood. The patients are generally pale, flaccid, sickly children, in whom the bones share want of nutritive energy and physical force in common with the muscles and other organs. The great indications, therefore, are to correct any disorder of the digestive system, and to endeavour to invigorate the body by light nutritious diet, fresh air, cold ablutions, &c.. together with some medicinal tonic, such as quinine or iron. It is sometimes necessary to prevent the progress of the deformity in the lower extremities by steel supports, which may assist in bearing the weight of the body. The child with weak legs should be carried out in the air, and allowed to crawl about, but not to stand upright for any length of time.

We are obliged to be content with endeavours to prevent the further progress of the deformity, and allow the bones to solidify in their bent shape, for we cannot effect much benefit by attempts to straighten them. A few cases are related where the bones are said to have resumed their natural shape more or less completely. One is quoted from Ravaton, of a girl, aged 13, who, in consequence of rickets, was only three feet in height; she was confined to her bed with continued fever for three months, during that time the bones straightened and lengthened, so that at the end of it her stature had increased to five feet one inch.

I believe the lateral curvature of the spine resembles in all essential points the ordinary rickets of the extremities, depending, like it, upon the development of the osseous structure being insufficient to enable the bones to bear the increasing weight of the body. Like rickets, it is for the most part an affection of a passive kind, occurring during the period of growth, and is devoid of pain. Sometimes, however, it puts on active symptoms, progresses more quickly, and seems to depend upon an injury or some inflammatory disturbance.

In an affection of the spine, nearly allied to the one just described, particular bones are apt to suffer more than others, and these undergoing absorption or ulceration, are actually destroyed instead of being merely compressed. The vertebræ above and below falling into contact, become pressed together, so as to form an angle which projects backwards, and the superabundant arches corresponding to the destroyed bodies of the vertebræ are thrown into a wide curve over this angle, so that abundant room is still left for the passage of the spinal cord, and paralysis of the lower limbs very rarely ensues. This distortion generally takes place in children or young persons, and is situated near the middle of the dorsal region, or between the shoulders; hence the name "hump-back" is given to it. Slighter bendings in opposite directions take place above and below the chief one, which have the effect of maintaining the head erect, just as we found to be the case in lateral curvature, the change in the conformation of the chest is also much the same, the ribs being flattened at the sides and the sternum thrown forwards.

It seems not improbable that angular curvature of the spine corresponds with the changes just described as being produced in other bones by inflammation supervening when they are the subject of rickets, or in persons of scrofulous or sickly constitution. This specimen of angular curvature corroborates the opinion; the vertebræ above and below the chief seat of disease are porous, friable, and easily broken, a condition not unlike that of the monkey's bones just shewn you.

The changes leading to angular curvature are often unattended with pain or other inflammatory symptoms. The back is observed to "grow out," and in course of time it ceases to do so; no particular cause being assignable for the commencement or the cessation of the disease. It is probably often attended with the formation of an abscess at the seat of the mischief, though that abscess very seldom presents externally. It remains in a quiescent state, becoming enveloped in a thick wall of false membrane, or it is gradually absorbed. I have found such an abscess in the examination both of recent and long-standing cases, and have

known it come forward several years after the commencement of the deformity in the back.

It is further to be observed, that in both lateral and angular curvature of the spine, as in corresponding affections of the other bones, there is in after life a decided disposition to an excessive formation of bony matter. The vertebræ become harder, and they are anchylosed together, in these specimens, by bridges of bone passing from one to the other over the intervertebral substance, thus strengthening the column and at the same time preventing the possibility of a return to its natural shape.

After what has been said respecting the pathology and causes of lateral curvature, you will have no difficulty in apprehending the principles of its treatment. In addition to the measures most conducive to the general health, a moderate exercise of the part should be permitted. Do not enforce a rigid and tiring routine of exercises with dumb bells, &c., for this is likely to overstrain and weaken the back, and induce an increase in the disease; rather encourage the patient to take such recreation in the open air as she is able to enjoy. Allow her to lie down when she feels disposed, not upon any particular couch made to suit the fancy of others, but in such a position as is found to be most easy. Let the dress be fitted so as not to interfere with the movements of the arms or the body. Institute the alterations gradually, and take care not hastily to deprive the spine of an accustomed support. Sponging with cold water once or twice a day, friction, shampooing, &c., will all be found serviceable. By judicious management, the progress of the deformity may be arrested in the greater number of cases, and, more than this, you will sometimes have the satisfaction of seeing the spine become straighter as the patient grows stronger.

It is scarcely necessary to condemn the practice of making the patient lie in certain positions upon a hard mattrass or board, the spine being stretched from time to time with pulleys; for it is now hardly ever adopted. The recent proposal of treating the deformity like a club foot and dividing the lumbar fascia and some of the muscles, is not likely to gain ground in an age of pathological inquiry like the present. Viewing the operation in its most favourable light, it will at once strike you that it is only one of the secondary and compensatory curves which would be in the least affected by it, and, therefore, evil rather than good would be accomplished by its success.

In severe cases, where the deformity is evidently increasing, it will be found desirable to furnish some artificial support to the spine, by steel props or crutches extending from the pelvis to the shoulders. If these be well made and fitted into the dress, they will afford great relief and will enable the patient to take exercise, of which she would be otherwise deprived. The means above mentioned for improving the general health and strengthening the back should, of course, be combined with these measures as far as possible.

A curvature of the spine does not necessarily indicate any very strong disposition to rickets in the rest of the bony system. It generally commences after the period at which rickets is displayed in other parts, and very frequently exists alone. You need not, therefore, be apprehensive of

any deformity of the pelvis because the back is bent, unless there be some manifestation of rickets in the lower extremities.—*Prov. Med. and Surg. Journal, March* 20, 1850, *p.* 143.

78.—OBSERVATIONS ON MOLLITIES OSSIUM.

By G. M. Humphry, Esq., Surgeon to Addenbrooke's Hospital, Cambridge.

There is a disease of the bones, not uncommonly described under the title of rickets, and sometimes confounded with it, respecting which it may be well to say a few words. The disease referred to is called "mollities ossium." It is rather a vague term, and has been made to include a variety of affections,—cancer of the bones and rickets among others. In the sense in which we use it at the present day it signifies a disease of rare occurrence, so rare that you may never see a case in your lives. Nevertheless, it is a distinct disease, and the recorded cases that you will meet with in your reading, as well as the specimens in pathological collections, are sufficiently numerous to render it deserving of your attention.

It generally takes place in the following manner:—A woman (the affection is more common in women than in men) who has reached or passed the middle age, suffers an attack of rheumatism, paralysis, or a severe labour, which gives a shock to the system and prostrates her strength so that she does not quickly rally from it. After continuing in indifferent health for a time, she suffers pains in the limbs, which are aggravated at night, and are thought by herself and her medical attendant to be rheumatic. However, the pain continues and is accompanied by increasing weakness, loss of appetite, and an alkaline state of the urine. Perhaps she is pregnant again, and though the disease may not make much progress during the time, each labour prostrates her powers still lower and aggravates her sufferings. After unusual pain at some one part, the bones are observed to bend there, or they suddenly break during a slight exertion. Things go on in the same manner—one bone giving way after another, till the patient becomes utterly powerless, and in a few exaggerated cases she is described to have been reduced to a mere helpless mass of flesh. The course of the complaint is sometimes extended over several years; the amount of pain varies much, and the patient generally dies of exhaustion before she has reached the condition just mentioned.

Now, you will find many cases scattered up and down among surgical works, which correspond more or less closely with this account; some of them were evidently instances of cancerous disease, the real nature of the malady not having been understood by the writers, but in others the bones had undergone the change characteristic of mollities ossium, of which the chief feature is atrophy. Without being reduced in size they have undergone interstitial absorption, and are in consequence much altered in density; they are light, porous, and fragile; the haversian canals are dilated, and the cells of the cancellous texture are large;

often the spongy substance is entirely removed from the interior of the shafts of the long bones, and the outer wall is so thin that it yields under the pressure of a finger nail. The cavities produced by absorption of the osseous substance are loaded with fat or oily matter, which has soaked its way into the remaining structure, so that the bones are very difficult to clean. Sometimes the interior of the bone is occupied by a soft, reddish, jelly-like substance, or by coagulated blood: now and then the red substance is absorbed, leaving cells filled with transparent fluid and lined by a membrane. These latter appearances seem to have been found when the progress of the disease was rapid or attended with much pain. In most specimens of the disease the change that has taken place does not consist simply in partial absorption of the bony substance, accompanied by the effusion of a new material into its place; but, further, the osseous tissue which remains is throughout unhealthy, soft, and deficient in earthy matter, so as to admit of being cut easily with a scalpel. It is saturated with oil, and in some places will crumble between the fingers. In a specimen examined by Dr. Bostock, the earthy salts composed less than an eighth, instead of forming about one half of the whole substance.

The extent to which this change proceeds in the unabsorbed osseous structure, varies as much as the nature of the material effused into the vacant spaces. Here is a thigh bone from a man about 60 years old, which broke as he was turning in bed; and you see how soft and crumbling as well as porous it is. In this other specimen, where the whole skeleton is exceedingly light, and the absorption has proceeded to as great an extent as in the former, widening the cells and canals, hollowing out the bones, and reducing their walls to wafer-like tenuity, the remaining osseous substance is tough, and appears to be nearly sound. We do not know the history of the latter case; probably the change took place slowly; the bones resemble those found in persons who have been long bed-ridden, and subject to simple atrophy from disease.

This brief description is sufficient to show that mollities ossium differs from rickets in so many respects as to deserve a distinct name and a separate notice. In the first place, it occurs at a later period of life, commencing generally long after adolescence and sometimes taking place in advanced age. Secondly, it is an active disease, consisting not as rickets essentially does, in a mere failure of the building processes, but depending on an alteration and rapid absorption of the materials which compose the skeleton—a pulling down of the structure after it has been completed. It presents the corresponding symptoms of pain and fever, and as you have just seen, effects other changes in the bones besides a mere wasting of their texture. It is quite true that rickets is not always a passive disease, consisting in a want of developmental force; it sometimes puts on a more active form, and then resembles the affection we are now discussing.—*Prov. Med. and Surg. Journal, March* 20, 1850, *p.* 146.

79.—ON THE SITE OF MORBID ACTION IN DISEASES OF BONE.

By Prof. Goodsir, Edinburgh.

I have, in another place, directed the attention of the physiologist to the important distinction which exists between the essential and accessory elements of a texture. "A texture may be considered either by itself or in connection with the parts which usually accompany it. These subsidiary parts may be entirely removed, without interfering with the anatomical constitution of the texture. It is essentially non-vascular, neither vessels nor nerves entering into its intimate structure. It possesses in itself those powers by which it it nourished, produces its kind, and performs the actions for which it is destined; the subsidiary or superadded parts supplying it with materials, which it appropriates by its own inherent powers, or connecting it in sympathetic and harmonious action with the other parts of the organism to which it belongs."

The neglect of this distinction by the pathologist has been the cause of much misconception regarding morbid action in textures, and has introduced many errors into the general theory of disease.

Disease may have its site either in the essential or accessory elements of a texture.

Our knowledge of the diseases which have their site in the essential elements of the textures is still in its infancy; but I am inclined to believe that they consist principally of alterations in the nutritive and reproductive functions, in the chemical or physical constitution of the textures. The fatty degeneration of the muscular texture is a familiar example of a morbid change of this kind.

The great majority of the recognised morbid changes have their site in the accessory elements of textures. They are situated in the midst of the areolar texture, and among the vascular and nervous networks which separate as well as connect all the essential textural elements of the frame. They consist generally of bloody or other infiltrations; of lymph, in various stages of development; of pus; of the various forms of new formation, such as cancer, tubercle, &c. It will thus be perceived that the majority of diseases are situated, not in the essential textures of a part, but around or amongst them; that the majority of these are new formations, parasitic in their nature, making their appearance, undergoing development, and occupying a position in the areolæ of that general connecting texture, which, either in the form of the nucleated cellule, or of the filamentous fibre, is the first to appear, as well as the most lasting and abundant, of all the textures.

The more distinct the conception, therefore, which an observer may possess of the relative position of the essential and accessory elements of any given texture, the better prepared will he be to investigate and understand the phenomena of diseased action in that texture.

The successful investigation of the site and phenomena of diseases in one texture will render the investigation in all the others comparatively easy. I have been accustomed to consider the osseous texture

as best adapted for this purpose, from its stability, and the comparative ease with which its essential and accessory parts may be separated from one another, distinguished, and examined. "A well-macerated bone is one of the most easily made, and at the same time one of the most curious, anatomical preparations: it is a perfect example of a texture completely isolated; the vessels, nerves, membranes, and fat, are all separated, and nothing is left but the non-vascular osseous substance."

The essential elements of the osseous texture consist of all that part which resists maceration, along with the contents of the corpuscles.

The accessory elements are the periosteum, with the vessels and nerves which ramify in it; the cells, areolar texture, fat, vessels, and nerves, which occupy the continuous network of haversian canals and cancelli, which are hollowed out in the hard substance.

I have been led to conclude,—

1. That in the osseous, as well as in the other textures, we must distinguish between those morbid conditions which have their site in the essential, from those which are situated in the accessory, parts of the texture.

That, in reference to the changes in the essential parts of bone,

2. Caries, one of the most obstinate and painful affections of the texture, depends on the more or less complete obliteration of the corpuscles and canaliculi, and the conversion of the carious surface for a certain depth into a substance resembling the enamel of the teeth.

3. That all the inflammatory changes in bone have their site in, and depend on, the increase or diminution in the number and size of the haversian canals.

4. That all the malignant and non-malignant growths in bone have their site in the haversian canals.

5. That the various forms of spicular and laminated exostosis, which are found coexisting with malignant or non-malignant growths, are necessary results of the dilatation and extension of the affected haversian canals.—*Monthly Journal, Feb.*, 1850, *p.* 99.

80.—*On Gonorrhœal Rheumatism.* By BRANSBY COOPER, Esq., F.R.S.—This is a not unfrequent result of gonorrhœa; but, it has been stated that it only occurs in cases in which balsam of copaiba had been administered. The copaiba seems to establish a tendency to inflammation of the synovial membranes; and those who advocate the use of cubebs in preference to copaiba employ this as an argument in favour of the former. I must acknowledge that, in all the cases of gonorrhœal rheumatism I have seen, copaiba had been given in an early stage of the original disease; and, if it continue to be employed, it greatly aggravates the rheumatic symptoms. Such cases are not, however, sufficiently common to enable one to acquire much experience upon the subject, Gonorrhœal rheumatism is very difficult to cure; generally, the subjects cannot bear depletion, and colchicum does not seem to exercise any influ-

ence over the disorder. Calomel and opium ought to be given, and iodide of potassium and liquor potassæ are also of considerable service. Indeed, any of the remedies which give tone to the stomach will be found useful in these cases, as they are always, I believe, marked by disorder of the digestive organs and bowels.—*Med. Gazette, Dec.* 7, 1849, *p.* 958.

81.—*On Necrosis, caused by Exposure to Phosphorus Vapours.*—[Mr. Stanley recently had a patient at St. Bartholomew's Hospital, who had lost the whole of his lower jaw by necrosis. The affection was ascribed to the influence of phosphorus vapour, to which the man was exposed in his trade of a *lucifer-match maker.* It appears, however, that means are now adopted to prevent such disastrous effects occurring in this occupation. We are told that]

Workmen in lucifer-match manufactories have now a chance of escaping the baneful effects of the evolution of phosphorous acid, by placing saucers filled with oil of turpentine about their work-rooms. As oil of turpentine is a solvent of phosphorus, it is expected that it will absorb the vapours which do so much mischief. This precaution is taken at a large lucifer-match manufactory in the neighbourhood of the London Hospital, and the very best results are expected from it. This case, so instructive in itself, was rendered peculiarly valuable in being brought forward by the distinguished author on 'Diseases of the Bones'; and we were sorry that the time and place did not allow Mr. Stanley to enter fully into the different questions which such a case naturally gives rise to; for instance, as to whether the fumes act primarily on the periosteum, or whether the jaw is secondarily affected. This question (left unsettled in the work just alluded to) appears of some importance; for if the constitution be affected first, the poison might be counteracted by throwing appropriate chemical agents into the blood. The two cases mentioned in 'The Lancet', (Nov. 10, p. 498,) by Mr. Henry Taylor, of Nottingham, will prove very valuable to those who may investigate this subject in all its bearings. Two men, who were employed for a considerable time at the manufactory before they experienced any ill effects,—one in the upper, and the other in the lower jaw,—suffered necrosis. These men were "dippers"; and it is but fair to suppose that the hand would have been the first to suffer, had the effect been direct. It must, however, be confessed, that the *upper* maxilla being affected, in Case 1, militates against the following passage, which we find at p. 75 of Mr. Stanley's treatise: "Against the opinion that the phosphoric vapour acts merely as a local excitant, the objection has been urged, that it produces no effect on the periosteum of the bones of the nasal passages, through which the vapour is directly inhaled." That these cases should not be classed among ordinary necrosis of bones, is sufficiently obvious, the entire absence of the least attempt at the regeneration of bone being the most characteristic differential feature. Nor could this regeneration well take place, as, to use Mr. Stanley's words, (p. 75,) "there is here a total want of the essential conditions for the reproduction of bone—namely,

inflammation in healthy structures, with health in the general system." The grey, pumice-stone-like, newly formed osseous substance, found by Dr. Heyfelder on the outer surface of the portions of bone which he extracted in similar cases, likewise points, as Mr. Stanley remarks, to an affection distinct from the usual death of bone. ('Lancet,' Nov. 16, 1849.) —*London Journal, Dec.* 1849, *p.* 1156.

82.—*Account of a New Apparatus for Treating Fracture of the Clavicle.* By Dr. J. B. Coleman.—This instrument and its mode of action upon himself is thus spoken of and described by Dr. Coleman:

It was so arranged, that force applied to the ends of a lever at the sound shoulder, should produce the motions that were necessary to draw the fractured ends of the bone into true anatomical position, and hold them there, with but slight inconvenience to the patient. To do this, the apparatus was in the form of a shoulder brace, made of steel, and in outline nearly resembling the claviculæ joined together at the back. The space occupied by each clavicle was left open, or in other words, the steel work surrounded each bone, so that it could move considerably within the included space. The space over the scapula of the injured side was covered with buckskin, tight as a drum head, so as to make resistance on that part, and prevent motion; the other side was left open to allow free motion of that shoulder. The central part of the back brace had a long pad resting upon about eight inches of the spine. This prevented excoriation when force was applied. The extremity of the brace on the side of the injury, projected farther laterally than the axilla, and above the deltoid projection of the shoulder. From this point a strap, furnished with a buckle for adjustment, passed down through the head of a wedged-shaped pad placed in the axilla. From the other side of the brace, two ends projected, one above, corresponding with the first named, the other lower down, on a line with the bottom curves of the brace. From these ends, straps proceeded to attach to a sling in which the arm of the injured side was suspended. The strap from the upper end buckled to the upper part of the sling, near the wrist, and that from the lower end, to the inner and lower part of the sling, somewhere about the middle of the forearm.

The operation of this arrangement is obvious. We have here a lever of the simplest kind. The power, the weight of the arm of the affected side, drawing by the hand, as occasion may require, on the straps connected with the ends of the shoulder brace last described—the fulcrum, the backbone; the resistance, the shoulder of the broken clavicle. The direction of the force upon the injured part is upward, outward, and backward; the means of retaining the bone in position simple, always at command, and not the least impediment to the mechanical movements of the ribs. The only point liable to excoriation is the axilla, and with this apparatus, less than any other.

To prevent the brace from sinking on the back, and to guard against any lateral swerving, a piece of wood or metal about two inches wide is made so as to have sufficient elasticity, is attached to the central piece,

extending down the spine, and adapted to its curvatures. This reaches somewhere near the waist, and is secured by a belt passing around the body.

Fifteen days after the fracture of a collar bone, I applied this apparatus to myself. Up to this time the slightest jar caused a movement between the ends of the bone, and unless the bandages were intolerably tight, perfect adaptation seemed impossible. From this instant, position was easily maintained, no movement seemed to disturb the bone, I was able to ride over rough roads without the least inconvenience, and when union took place there was, what is extremely rare after these accidents, not the smallest distortion of outline. This experiment led me to use the apparatus in many other cases in which the results have been the same. ('New York Journal of Medicine.') – *Prov. Med. and Surg. Journal, Dec.* 26, 1849, *p.* 716.

83.—*New Method of Treating Fractured Ribs.* By H. HANCOCK, Esq., Surgeon to Charing Cross Hospital. –[Mr. Hancock does not employ either the bandage or venesection, believing these means to be unnecessary, or even injurious. We are told that]

He relies chiefly on opium. By the use of this drug he subdues irritation, moderates inflammation, procures to the patient a very desirable amount of rest, and wards off all the thoracic complications which sometimes render these cases extremely serious.

It appears, from a great number of cases of fractured ribs treated with complete success, without bleeding or bandage, that Mr. Hancock's method is at least as efficacious as that which has hitherto been adopted. —*Lancet, May* 4, 1850, *p.* 534.

84.—ON THE PRACTICE OF TENOTOMY IN SOME CASES OF FRACTURE.

[At a late meeting of the Royal Medical and Chirurgical Society, Mr. C. De MORGAN related the following cases of tenotomy in fracture, a practice not unfrequently followed by Continental surgeons. The first case occurred to Mr. Shaw, and is the following:—]

W. S., aged forty, was admitted into the Middlesex Hospital on Feb. 12th, 1847, having fallen down stairs in a state of intoxication. Both bones of the leg were broken, and the fracture of the tibia extended through both malleoli, the foot being twisted outwards. Violent spasms of the muscles frustrated all attempts to keep the fractured extremities of the bones in apposition; the slightest movement brought on this spasmodic contraction, which extended to all the muscles of the limb, so as to cause great distortion of the foot, and render the skin over the base of the tibia extremely tense. All the symptoms continuing unabated on the following day, and the suffering of the patient being con-

siderable, Mr. Shaw determined on dividing, in the usual way, the tendo Achillis, which was very tense. After this, all the difficulties entirely ceased, and no further trouble was experienced in the treatment of the case. The second case occurred in the author's own practice. The patient was a female, aged sixty-six, of drunken habits, and was admitted into the Middlesex Hospital in March, 1849. She had been knocked down by a cab, and both bones of one leg were fractured a little above the ankle. The symptoms and condition of this patient were very similar to those of the last, and every mechanical and therapeutic measure which could be suggested to relieve the spasms were tried in vain. The author divided the tendo-Achillis on the ninth day, with instant relief to the suffering of the patient, and immediate removal of all untoward symptoms. In less than a month, the chasm left after division of the tendon, which was not very great, had disappeared; and, a fortnight subsequently, she was able to walk on crutches, and the foot was free from deformity. After some general remarks on the value of the operation in the foregoing cases in relieving suffering and spasm, the author proceeded to remark that he thought so simple and harmless a proceeding as dividing the tendo Achillis might be adopted with advantage in other cases of more frequent occurrence, especially as the cure would not thereby be retarded. He concluded with noticing a remark of M. Bonnet's, that he has frequently divided the tendo Achillis in cases of diseased ankle-joint, where rest was imperative, and the heel was drawn up by the muscles inserted into it.

Mr. B. PHILLIPS said, that the paper was one of much interest, as it referred to the treatment of fractures and injuries of joints. The plan mentioned in the paper had been adopted in Germany and France to some extent; he trusted, however, that it would never meet with the same reception from British surgeons. Cases might occur in which the division of the rectus in fracture of the patella, or of the triceps for fracture of the olecranon, might be resorted to harmlessly, or usefully employed, where difficulties presented themselves in treatment, but, on the contrary, these operations might be resorted to where no necessity for the proceeding might exist. The propriety of the operation, however, under any circumstances, might be questioned. Let us look at the effect of the division of a tendon when of the proper length, as it would be in the cases in which it was proposed to divide it. Immediately, on section, the cut ends of the tendon separated to the extent of half an inch or more; this was usually the case, and in the instances recorded in the paper would appear to have occurred; a large space would thus have to be filled up by the deposit of new matter, and the tendon would be elongated. This occurred in cases where the tendo Achillis was divided for retraction of the heel. When the tendon, before operation, was of the normal length, he feared the same result would follow as occasionally took place when the tendo Achillis was ruptured by accident; the tendon would be so long that the heel could never be lifted from the ground. The late Justice Taunton ruptured the tendo Achillis when dancing, and was lame ever afterwards; he could not raise his left heel. He feared this kind of result would render the operation at best but doubtful, though this elongation did not take place in the cases under discussion.

Mr. LONSDALE had had some experience in the division of tendons for the cure of deformities, and he had no such fear as that expressed by Mr. Phillips, that the tendon would become elongated on incision after division; on the contrary, his fear was, that it would be too short, and that union would be too rapid if proper extension were not kept up. In cases where the muscles were paralyzed and weak, the tendon after division might certainly become elongated, but not so when the limb was healthy. If the parts were kept properly together, no unnatural elongation would occur.

Mr. AVERY had seen many preparations, in which tendons had been divided, and the union was so close that it was difficult to determine where the section had been made.

Mr. DE MORGAN observed, that in the cases related, the chasm between the divided portions at first did *not* exceed a quarter of an inch, that being sufficient to get the bone into position, and in a short time after there was no appreciable space at all. From what he had seen of the division of tendons when divided subcutaneously, he had no fear of their becoming lengthened. The cases in which tendons were lengthened from rupture by accident bore no analogy whatever to the cases he had related. He should not hesitate, after what he had observed, to perform the operation in cases of less severity than those detailed—even, indeed, to save two or three nights of pain or uneasiness to the patient. He should not hesitate to divide the tendo Achillis in cases of fracture of the lower ends of the tibia and fibula, where there was much spasm, even though that spasm might be relieved by splints or other apparatus.

Mr. CHARLES HAWKINS considered that the operation under discussion might be usefully employed in some cases of injury, in which neither fracture nor dislocation was present, as well as to relieve some of the urgent symptoms which occasionally presented themselves during the first few days in cases of fracture and dislocation. He had no fear that the tendon would become elongated. The plan, he thought, might be advisable in certain cases of fracture of the patella, which was an accident, as a general rule, reflecting less credit on the surgeon than almost any other. The limb was scarcely ever a useful one after that accident. This arose, no doubt, from the difficulty of keeping the ends of the divided bone in apposition. He had seen but one case in which bony union had followed fracture of the patella, but in this case the other patella had been afterwards broken, and lameness was the result. A case had presented itself to him the other day, in which it appeared to him that division of the tendo Achillis might have been of advantage. A lady, about eighteen months ago, became alarmed whilst driving along a country road, and jumped out of the carriage. She walked a considerable distance afterwards, but on reaching home complained of severe pain in the ankle joint, to which several applications were made, without affording her any relief. It remained stiff, painful, and useless, and the advice of the late Mr. Key was sought. Amongst other applications, caustic around the ankle was ordered, the cauterized surface to be kept open. He (Mr. Hawkins) saw this patient about a month ago. The ankle-joint was uninjured, but the tendo Achillis was so contracted that she could not put her heel to the ground, and was obliged to walk

on her toes. There was great pain, which was relieved on the foot being straightened. No kind of apparatus had been of service. Might not division of the tendo Achillis in this case relieve the spasm? He thought, at all events, the trial should be made.

Mr. Le Gros Clarke did not think that the profession generally would agree in the remark of Mr. Hawkins respecting the lameness said to follow fracture of the patella. He did not regard the division of the ligamentum patella as so unimportant as some seemed to think it, recollecting its contiguity to the knee-joint; and he questioned even its utility; for supposing that it did assist us in keeping the divided portions of bone together, the tendon would elongate in proportion, so that what we got in one direction we lost in another.

Mr. Lloyd, with respect to the question as to whether union was close after division of tendons or not, would answer, that in general the union was close. At first some space would exist, but it gradually got less until it would be almost inappreciable. He could understand that in some cases of fracture division of tendons would be serviceable, when, from the powerful action of the muscles, the ends of the divided bone could not be brought and kept together. He had never divided the tendo Achillis for this purpose, but he had suggested it. He was somewhat astonished at the remark of Mr. Hawkins respecting the results of fracture of the patella. The accident was a very common one; so far as he knew, all the patients he had seen recovered with good limbs, and could, after a time, walk well. He recollected the case of an old gentleman who fractured both patellæ: he was confined to one position for some time, but he eventually recovered and walked well. Younger persons usually walk as well after as before the accident. A gentleman, a good shot, and a great walker, fractured his patella from a fall; the accident was not discovered for some time, as his leg was broken by the same accident. When the fracture of the leg had united, the divided portions of the patellæ were found three inches apart. Contrary to expectation, at the end of a few months he walked as well as ever. When he (Mr. Lloyd) was first a student, the divided portions of patella were attempted to be brought together by force; the result was, inflammation of the tissues of the joint, and occasionally lameness; but now such untoward results were not to be looked for. He had seen bony union of the patella in only one case, though he had seen the bone united after being broken into several pieces.

Mr. Charles Hawkins, in his observations, had referred to cases of fractured patella after they had left the hospital. When they left the care of the surgeon, they seemed well; but when the muscles were used and acted on the bone, the space between the divided bone became elongated, and the limb was used with difficulty. He mentioned the case of a country gentleman in whom this had occurred, no apparatus, except a very cumbrous one, being of service. He had seen a case of bony union of fracture of the patella consequent upon a blow from a wheel. Inflammation of the joint followed; no apparatus was applied; the leg was kept in the form of the letter V; and recovery, with bony union, took place. The other patella was subsequently fractured: bony union did not occur, elongation took place, and the motions of the limb were interfered with.

Mr. BAINBRIDGE (Tooting) had some years since seen an instrument, which was invented by the late Mr. Earle, for treating fractures of the patella. He now used this instrument in cases of this accident: the patient walks about with it, after a few days; and never suffers from injury to the motion of the leg. Such injury, he believed, arose from binding the limb too tightly. He had seen cases in which the limb was bandaged from the toe to the hip. He related a case, in which the ends of the divided bone were three inches apart, and yet the patient, a heavy man, walked well and freely. He related another case, in which the knee-cap was in the middle of the thigh, and the man walked about well. He had used Earle's apparatus.

Mr. HODGSON said, that generally, after tendons had been divided, they were shortened. He might mention, that in some cases in which the tendo Achillis had been divided for deformity, he had found the use of complicated apparatus to retard the cure, by producing sores and other inconveniences. In cases where section of this tendon had been resorted to, he thought it better to employ passive exercise of the parts; and when able to bear it, to stand on the leg, and swing it backwards and forwards. In all cases of fracture of the patella which he had had an opportunity of examining after death, the union had been by cartilage or ligament. He had not seen a single instance where the fracture was longitudinal, of bony union. The ligamentous union was, he thought, to serve a good purpose; for were the union osseous, exudations from the bone might interfere with the motions of the limb. He had seen two or three cases, in which the tendon above the patella had been ruptured, and a chasm was left afterwards, into which three fingers might be placed. This remained for life, to the great inconvenience of the patient.

Mr. LONSDALE considered that the shorter the ligamentous union between the divided portions of the fractured patella, the better it was for the patient; for the longer it was, the more difficulty he would have in walking. So long as the upper portion of the patella lay within the trochlea of the femur, the limb would be tolerably useful; but when above it, not so.

Mr. LLOYD said, that in cases of fractured patella, he was in the habit of placing a splint at the back of the leg, during the progress of cure and some time afterwards; this he regarded as beneficial in keeping the divided portions of bone together.

Mr. ERICHSEN thought the Society greatly indebted to Mr. De Morgan for having pointed out so simple a means to enable the surgeon to obtain proper command over the foot in cases of fracture of the leg. Every surgeon must have experienced great difficulty in the treatment of oblique fractures of the tibula and fibula low down, from the inability to keep the foot in position, in consequence of spasm of the muscles of the calf, and if section of the tendo Achillis removed this, it was certainly a justifiable procedure. There was one class of injuries that had not been adverted to this evening, in which section of the tendo Achillis had been advantageously resorted to—he meant dislocations of the astragalus forwards; and its employment in these cases was one of the many improvements in surgical practice for which we are indebted to the

modern school of Dublin surgeons. In the cases he alluded to, reduction was prevented in consequence of the impossibility of disentangling the upper surface of the calcaneum from the articulating surface of the tibia against which it was jammed by the spasm of the strong muscles of the calf. Now in these cases the tendo Achillis had been divided with the view of removing this spasm, so enabling the surgeon to obtain command over the foot and to reduce the astragalus. It had been done successfully in Dublin, but he was not aware that the operation had been practised in this country, except in one case in the provinces, that had been mentioned to him by his friend Mr. Cadge.—*Lancet*, *Dec.* 8, 1849, *p.* 618.

ORGANS OF CIRCULATION.

85.—ON THE TREATMENT OF ANEURISM BY ELECTRO-PUNCTURE.

By M. Abeille.

At the last meeting of the Academy of Medicine, M. Abeille, assistant physician to the Val-de-Grace, read a memoir on the above subject, of which the following is a summary:—

A female, 67 years of age, was affected with a tumour of the size of a hen's egg, which projected between the scaleni muscles, and presented all the characters of aneurism. It was, in fact, a pulsating tumour, the pulsations being isochronous with those of the heart; pressure on the artery above the tumour reduced it partially in size; pressure over the tumour gave rise to a sensation of *fremissement* under the hand, and the ear detected a very sensible *bruit de soufle*. From these symptoms, and particularly from the fact, that pressure above the tumour arrested the pulsations of the axillary and radial arteries, it was concluded, that the subclavian presented the anomaly of a common origin with the carotid, and ascended over the clavicle to penetrate between the scaleni muscles. All the medical men who examined the tumour were of opinion that it was arterial, and the operation of electro-puncture was accordingly performed on the 10th February, 1847. The pile employed was composed of twenty pairs of zinc and copper plates; the needles were steel, four in number, two to two and a-half inches long, and covered with an isolating mastic to within one line of the point and two of the head.

The patient having been etherised, the needles were passed into the aneurismal sac, and the battery set to work. Strong sparks were elicited, and the operation continued for thirty-seven minutes. On awakening, the patient complained of atrocious pain, attended by convulsive movements in the muscles of the arm and wrist.

Within five minutes after the commencement of the operation the tumour began to solidify; the pulsations were less distinct, and the pulse nearly disappeared. On extracting the needles, pressure, equivalent to a weight of two pounds, was applied to the surface of the tumour. It was

then quite firm, and without pulsation or bellows-sound. Twenty-four hours afterwards the pulse was totally absent in the radial artery; the arm was numbed and cold. As symptoms of cerebral congestion manifested themselves, it became necessary to practise two bleedings. After the fourth day the tumour began to diminish in size; on the tenth day it was much smaller, and on the eighteenth diminished by one-half. It now remained stationary for a few days, then began to diminish again, and gradually disappeared. Thus, on the thirty-seventh day, the skin appeared perfectly flat; on making pressure, an oval, flattened, and firm body was felt in the place occupied by the sac; and even three months afterwards some traces of the induration could be perceived. At this period the artery had acquired a slight degree of development just above the tumour; and three branches, not before evident, and supposed to be the vertebral, inferior thyroid, and posterior scapular, arteries, were seen to radiate from this point.

It is now two years and a-half since the operation was performed, and the cure appears to be complete. The artery has not acquired any increased degree of calibre, and it requires excessive pressure with the finger to discover any trace of the old sac.

This, it must be confessed, is a brilliant success; and the fact, now indisputably proved, that electricity coagulates the blood in the living artery, may lead to further applications; but we must not conclude, from a few successful cases, that the new agent is to throw into the shade the discovery of Hunter. Even from the confession of M. Abeille, the pain occasioned by electro-puncture, in cases of this kind, is of so violent and distressing a nature, that the usual operation of ligature is preferable in all cases where it can be applied, as in aneurism of the femoral artery, &c. Besides, the accidents which may attend electro-puncture are fully equal to, if not greater than, those of ligature,—hemorrhage, cauterisation of the sac or skin, inflammation and suppuration of the sac, &c.

I should not omit to mention, in reference to the above, that M. Abeille has performed ten experiments on dogs and sheep, for the purpose of ascertaining whether the blood can be coagulated in a healthy vessel by means of electricity. In all the experiments the artery submitted to the action of electricity became plugged by a firm coagulum in a few minutes. ('Med. Times,' August 18, 1849.)—*Monthly Journal, Jan.* 1850, *p.* 71.

86.—*On a New Material for Arresting Alveolar Hemorrhage, &c.* By A. Beardsley, Esq., Derbyshire.—[The difficulty that sometimes occurs in arresting hemorrhage after the extraction of teeth, especially in a person of hemorrhagic diathesis, is well known. Mr. Beardsley describes a composition which he has found useful as a plug in such cases, and also for other purposes.]

J. T., aged twenty-three, applied to me, on the 27th November, 1847, to know if I could extract for him the first molar tooth, upper jaw, right side. He stated that the adjoining tooth (second molar) had

been extracted two years previously, and that he nearly lost his life from the excessive hemorrhage which followed, and which defied the use of every remedy for several days. He was naturally anxious about the result; and as there was every probability that it might occur again, I devised the following means of arresting it, so as to be prepared:—I made a composition of gutta percha, tar, creosote, and lac, which can be rendered quite soft by moulding with the fingers, which is not at all sticky, and which again hardens in any shape into which it has been moulded.

On the next day I extracted the tooth. Immediately afterwards a jet of bright arterial blood followed, and flowed abundantly, the patient's mouth being full directly. I determined to try the usual remedies prior to using the above plug, and accordingly first tried the dossils of lint; but the hemorrhage was so rapid that it was perfectly useless. I introduced lint dipped in alum, the sesquichloride of iron, and then lint again, which appeared to diminish the flow a little, and after five minutes so far abated that the man went home. A short time afterwards, on opening his mouth, the blood flowed as freely as ever. He tried it till next day, and then came again, thoroughly blanched, the hemorrhage still profuse. I at once washed out all coagulum, and as speedily as possible inserted the above plug, softened as directed, and firmly pressed it into the socket. The hemorrhage was arrested immediately; the plug remained in situ without any trouble. Next morning the man brought back the plug, which had hardened in the socket, and was an exact fac-simile of the fangs of the tooth extracted. The case excited no further anxiety, and no hemorrhage afterwards occurred.

I also find the above composition a very ready and easy application for leech-bites, when the hemorrhage is at all troublesome. It is very adhesive when warmed, and firmly adheres all over the wounds when the part is wiped dry, and a small portion pressed on, just wetting the finger before doing so, to prevent it adhering to it also.

The proportions of the ingredients used are, gutta percha, one ounce; Stockholm tar, ounce and a half to two ounces; creosote, one drachm; shell lac, one ounce, or more, to harden it. To be boiled together in a small crucible, and constantly stirred or beaten, till it becomes thoroughly blended into a stiff homogeneous mass.

I have also used this composition moulded into bougies, which answer exceedingly well for stopping teeth, in toothache; and even for pessaries. The proportion of creosote can either be diminished or omitted for these purposes, though a little renders it more readily made, as it is a solvent of gutta percha.—*Lancet, Feb.* 9, 1849, *p.* 177.

87.—*On the Use of Collodion in Nævus.*—Dr. BRAINARD, of Chicago, struck with the contractile power possessed by the etherial solution of gun-cotton, was induced to test its application to the surface of erectile tumours. The first case which he treated in this way was an erectile tumour, the size of a strawberry, situated over the anterior fontanelle of a very young infant. Although the tumour was consider-

ably elevated above the general surface of the scalp, it was at once reduced when the solution had dried, and, after a second application, at the end of six weeks, seemed to be cured.

The second was a child, six months old, with an erectile tumour, of 3-4ths of an inch by half an inch, situated below the lower eyelid. This tumour had not existed at birth, but had made its appearance shortly afterwards, and attained its maximum size in about six months. Dr. Brainard applied the solution once a week, and, after two months' treatment, the tumour was hardly perceptible. ('N. W. Med. and Surg. Journal'.)—*Monthly Journal, Jan.* 1850, *p.* 72.

[May not this hint be extended to the treatment of hæmorrhoids, and hæmorrhoidal excrescences?]

ORGANS OF RESPIRATION.

88.—OPERATION FOR RESTORATION OF THE NOSE.

By W. Fergusson, Esq., Surgeon to King's College Hospital.

[In this case the loss of the nose was due to a blow, received a long time previously: the patient was now forty years of age. We are told that]

Mr. Fergusson gave, in this instance, the preference to the Indian method; and the patient having been placed under the influence of chloroform, a triangular piece of leather, cut into the shape of the new organ, and made to suit the irregularities of the stump, was spread flat upon the forehead, with its base uppermost; deep incisions, with subsequent parings, were then made along the margins of the deformed nose, following the line where the sides of the flap, to be presently cut from the forehead, were to be implanted. When the paring had been carefully and regularly done on both sides, Mr. Fergusson cut out the skin and cellular tissue of the forehead, down to the periosteum, according to the shape above mentioned, and this being carefully dissected from above, downwards, to the root of the nose, where the dissection was carried deep, to render the vascular connexion more extensive; the flap was twisted on itself, and its edges were brought into contact with the grooves previously made. An opening was here seen into the frontal sinus from an old exfoliation. The hæmorrhage was rather considerable, and somewhat increased the already great amount of trouble which this operation entails upon the surgeon; the sutures were, however, very neatly applied, three one side; they kept the transplanted structure very steadily in situ, and the angles of the raw surface on the forehead were likewise approximated by sutures. The cavity of the new nose, which was partly supported by the shrivelled remains of the old, was borne up by a small quantity of lint; the same was likewise put on the raw surface of the forehead; the parts were carefully and warmly wrapped up, and the patient removed.

Mr. Fergusson, in addressing the assembled pupils, remarked that

out of the various materials with which noses might be replaced, the patient had chosen his own skin, and that he had thought it right to comply with his request; the more so as he was a favourable subject for the operation, since the destruction of the organ had originally been caused, not by an idiopathic disease, but by a blow. The operation, as far as it had now gone, was only done in the rough; there was a great deal to shape out yet until the new organ should be brought to a proper form. Mr. Fergusson observed, that this would be an extremely painful proceeding, were it not for the great boon conferred by chloroform; and that Mr. Liston had performed the same operation soon after the anæsthetic use of ether had been introduced.

The patient, seven days after the operation, was attacked by erysipelas; he was delirious at intervals, particularly at night; the eyes and cheeks swelled considerably, and the new nose turned of a dull reddish colour. Still the wound of the forehead went on contracting and granulating nicely. The delirium became soon so violent, that the patient was at one time hardly prevented from tearing off the new nose; it was therefore found necessary to use the straight jacket, and to give him a male watcher. He, however, became gradually quieter, and about eighteen days after the operation he was more calm, dozing almost incessantly; his face assumed a more natural and sane expression, but when spoken to he gave no answer, and appeared to be deaf. The treatment of the erysipelas and violent symptoms consisted principally in stimulants, as chloric ether and ammonia, opium, wine, &c. The nose, however, and the forehead, were looking very well; the latter was fast cicatrizing, and the former seemed to have adhered firmly, especially at the root. The opening into the frontal sinus above mentioned remains patent, and seems not disposed to fill up. Twenty-two days after the operation the patient was removed into the physicians' ward, where, after having given a great deal of trouble with delirium tremens, he is now progressing very favourably.

We had a few days ago an opportunity of seeing this patient, and were highly gratified at observing the firm manner in which the transplanted flap had grown to its new situation. The nose, though in an unfinished state, looks remarkably well, the man having of course quite a different physiognomy. If it were not for the falling-in of the incisive portion of the upper jaw, the patient would certainly not have to complain of his looks.

It would thus appear that the rhinoplastic operation has in this case endangered the patient's life; and though erysipelas had a great share in these hazardous results, it cannot be denied that this apparently slight operation is not exempt from danger; neither are the statistics encouraging. Out of two patients, Blandin almost lost one; Lisfranc had one death; and Dieffenbach has recorded two fatal cases out of six. The Italian method, where the flap is taken from the arm, would *primâ facie* seems less liable to the complications mentioned above; but it is so inconvenient that it has been very justly abandoned. The French method, introduced by Larrey, in which the cheeks furnish the materials, has advantages in some cases, but is likewise liable to accidents.—*Lancet, April* 6, 1850, *p.* 419.

89.—*Mode of Extracting Foreign Bodies from the Nostrils.*—Dr. Homans for many years has practised the following: Closing the nostril which is free, he blows forcibly with his own mouth into the mouth of the patient, and the result is the discharge of the body. He states that, in no case where such substance completely obstructed the passage, as beans, peas, grains of corn, &c., had this method failed of success; but when the substance introduced was so shaped as not entirely to obstruct the passage, as a button, the air blown in might pass through and not remove the body. ('American Journal of Med. Sciences'.)—*Brit. and For. Review, April*, 1850, *p.* 544.

90.—CASE IN WHICH PARACENTESIS THORACIS WAS PERFORMED.

By Dr. G. F. Easton, Liverpool.

[A young man, 26 years of age, was the subject of an insidious pleuritic affection, arising from exposure to cold during convalescence from fever. Effusion took place, which did not yield to the use of mercury, blistering, and other remedies; and after a time there was evidence of the superaddition of pneumo-thorax. As, however, the quantity of air present appeared to be small, and as there were no symptoms of tubercular disease, it was supposed that the pneumo-thorax was not caused by the bursting of a vomica into the pleura, but was the effect of secretion. It being determined to perform paracentesis, Dr. Easton tells us:]

On Saturday, November 3rd, in the presence of Dr. Turnbull and Mr. Higginson, who kindly assisted me, a trocar was introduced into the right side of the chest above the eighth rib, and rather more than half a pint of pus removed. In attempting to adapt an apparatus to prevent the admisssion of air, the canula was partially withdrawn; and, as it could not be readily reintroduced, we were satisfied for the present with the information which was thus derived and the relief which was thus afforded. No bad symptom followed. A blister was applied to the affected side, and some cod-liver oil, with a bitter infusion containing iodide of potassium, was ordered to be taken daily, preceded on the first occasion by a purgative.

At the end of a week, the dimensions of the chest having undergone no change since the operation, and the other physical signs of the disease remaining as before, the operation was repeated, and eight pints of the same inodorous purulent fluid were slowly withdrawn. This was accomplished without producing any material effect on the patient, except a disagreeable feeling which arose about the middle of the operation, and increased towards its termination, resulting from the removal of pressure to which the displaced viscera had become accustomed, and from the necessity occasioned by the collapsed condition of the right lung for their rather sudden movement in an opposite direction, to supply the vacant space caused by the abstraction of so much fluid. This lasted during the four succeeding days, and was accompanied by inability to lie on the affected side, on which he had formerly reposed with greater comfort, and

by his experience as if any considerable pressure would have been attended with greater danger to the integrity of the ribs.

The entrance of air into the chest was effectually prevented by the use of an apparatus suggested by Mr. Higginson,* which, on account of its simple construction, its easy management, and its complete efficacy in this instance, I can recommend for employment on similar occasions, in preference to others of a more costly and complicated nature. It is simply a tube about a yard long, made of vulcanized india-rubber, which, being filled with water, and one of its extremities placed over the mouth of the canula, acts on the principle of a syphon. If it is properly adjusted, and the other extremity immersed in the fluid, air cannot by any possibility gain admission into the chest. The stream was free, uniform, and continuous, unaffected by the respiratory movements. To the middle of the tube was adapted an india-rubber bottle, which in this operation does not appear to be essential to success, when the fluid is moderately thin. When emptied by pressure, and then allowed to expand, it may be advantageously employed to clear the tube, if the passage happens to be obstructed by lymph or coagulum, or other small bodies of a soft and yellow nature, or to wash out the chest with water, or any of the lotions which have been recommended for the purpose. And these seem to be the chief, if not the only advantageous uses to which it can be applied.

It is generally stated by writers, that when the operation of paracentesis is performed at a stage of the disease when the lung is incapable of expanding, that the operator has a choice of but two alternatives. He must either be content with the amount of fluid he is able to withdraw from the chest before the stream becomes interrupted (which is often only a small proportion of what is left behind), or he must obtain a further supply at the expense of replacing it by atmospheric air, with the generally experienced consequences of renewed inflammation, increased and more offensive secretion, irritative fever, and too often rapid and irremediable prostration. Neither alternative is desirable: the former on account of the necessity imposed for a frequent repetition of the operation, the latter on account of the reasons already assigned. By the use of this simple apparatus both are avoided: the fluid may be almost entirely, if not wholly withdrawn; the sound lung is placed in the most favourable position for increased dilatation, and the condensed one gradually to regain its dimensions and recover its functions.

When the tube is filled, and its extremities placed in the positions I have indicated, its cavity is continuous with that of the chest, of which it may be made to form the most dependent part. The void uninterruptedly formed for the escape of the fluid at the lowest part of the tube is communicated upwards to the chest, where it will gradually increase, till the last remaining portion of the fluid has found its way by gravitation into the tube.

The patient sat during the greater portion of the time that was occupied in the withdrawal of the fluid, and towards the close was lowered into the recumbent posture to favour its escape by placing the opening in a more dependent position.

* Mr. Higginson's apparatus is described in the 'Lancet,' Feb. 27, 1847, p. 249, as a simple form of stomach pump, without valves or stopcocks.

The trocar used on this occasion was of the size generally employed in the operation for hydrocele. A gentle flow in this case was especially called for to prevent laceration of important structures within the chest, in consequence of there being no substitution (as in ordinary cases) of atmospheric pressure for that of the fluid withdrawn. For this reason, too, the patient was directed to breathe with ease, and warned to make no sudden or vigorous effort, which might at all subject him to the danger we have specified—a danger great in proportion to the amount of effusion.

[Up to the middle of the fifth week after the last operation, the patient improved much in health and strength; but at this time a relapse occurred, and it became evident that matter was again forming. As the symptoms were not checked by the ordinary means, the operation was again resorted to. We are told by Dr. Easton, that]

On the 22nd of December, six and a half pints of purulent fluid were withdrawn in the same way as formerly mentioned. It differed from that previously removed in being of a reddish-brown colour, and quite inodorous. When this quantity had been removed, the patient complained that the canula was causing pain. Attempts were made to place it in an easier position; but, instead of relieving the pain, they had the effect of so much increasing it, that, neglecting the means of obtaining a further supply of matter we had formerly employed with advantage (viz. that of laying the patient down to make the opening more dependent), the canula was withdrawn. By this omission a little fluid was left behind; and, by a little want of care either in adjusting or withdrawing the tube, a small quantity of air must have entered the chest, so as to render again audible the sound of splashing which had not been heard since the performance of the first operation. That the quantity was small was evident, as well from percussion as from the patient's experience of the same feeling I formerly mentioned, after this as the previous operation, though not to the same extent, or of so long continuance.

The two sides of the chest afterwards measured alike.

A favourable change in every respect immediately followed the operation. His sleep and appetite returned the same day, and the vomiting at once ceased. In two days the tongue was perfectly clean, and the cough greatly relieved.

The improvement, however, was of short duration. At the end of a fortnight the vomiting and other unfavourable symptoms returned. The vomiting was so severe as to return nearly every hour, as much as a quart of acid water being sometimes ejected at a time, and was particularly troublesome at night.

On this occasion I could assign no outward cause for the relapse, as the patient had avoided all stimulants, had never left his room, and had been almost entirely confined to bed. This circumstance, coupled with an observation that the constitutional disturbance was quickly followed by an enlargement of the affected side, led me to this conclusion,—that the operation in a case so far advanced as the present one, whatever other benefit it may confer, has no effect in checking the further progress of the disease, and that the formation of pus proceeds without materi-

ally affecting the constitution, until it does so after a considerable accumulation, by causing injurious pressure on the nerves and neighbouring organs.

If this be the case, then the disease is quite of a local character, not likely to yield to constitutional remedies, and may coexist and advance for a certain time (as, I think, on both these occasions it has done) with constitutional improvement. The shorter duration of the improvement on the latter than on the former occasion is probably attributable to the more rapid accumulation of the matter, partly in consequence of its less complete removal, and partly owing to the admission of air, which, by altering the character of the secretion, may have proved an additional source of irritation.

If this view of the case be the correct one, then it is obvious that a cure could not be obtained by the plan hitherto pursued, and could only be hoped for by keeping the secreting sac always nearly empty, with a view to its gradual contraction and ultimate obliteration.

Accordingly, the plan I formed was to remove the whole of the matter, wash out the right side of the chest with warm water, substitute a little clean water for a portion of the matter (as likely to prove less irritating), to keep off the feeling of constriction, and then leaving the plugged canula in the chest, to draw off a certain portion of it and the secreted fluid at short intervals; supporting the patient, in the meantime, by a nutritive diet.

This was put into execution on Tuesday, the 22nd of January. That the process of washing might proceed with facility and expedition, it was thought advisable to use something larger than the small canula hitherto employed, and of a material less liable to be acted upon by the secreted fluid. For this purpose a gutta-percha tube was formed, and for its admission an incision was made into the chest with a bistoury. It was easily introduced, and we were fortunate in having made it of sufficient size. At first the matter did not flow, and we were beginning to think there must be some mistake, when out it poured of a sudden, nearly as thick as treacle, of a sickly offensive odour, and of a somewhat darker colour than formerly. With the assistance of the syphon about three pints streamed forth. The stream becoming interrupted, some warm water was thrown in to dilute it. It again flowed freely, and we calculated that about two pints more of matter were thus removed, independent of the water with which it was mixed. Two or three injections of warm water were used, and it was our intention to have continued them until the water returned nearly colourless. After injecting the fourth quantity, only a small portion of it could be got back, in consequence of the large flakes of lymph, which we suppose the water had stirred up from the bottom of the chest. The tube was plugged and secured in the opening. He complained that it gave him pain; but as it was not severe it was left in its place.

On the following day, however, we learned that the pain in the wound had become so severe that it had been the cause of his passing a sleepless night. The tube was easily withdrawn, and a smaller one of a different shape substituted without pain in its place. By the aid of the syphon between two and three pints of fluid then came away, consisting of matter

mixed with the water left behind on the previous day. Some warm water was then injected, but the same difficulty presented itself we had formerly experienced. We could not get the whole of it back. Accordingly the canula was plugged, but the patient shortly afterwards complained that it was causing pain, which soon became excessive. After vain attempts to give him relief by partially withdrawing it, the pain became so intolerable that he earnestly entreated me to remove the tube. This I was very unwilling to do, but coldness spreading over the body, and a shivering coming on, I was afraid of his falling into a faint, from which it might be difficult to recover him, and I complied with his request. Air immediately rushed into the chest, and he experienced instant relief. The cause of the pain appears to have been, not the tube but the unequal pressure produced by the exhausting apparatus. A poultice was applied to the wound. He soon afterwards fell asleep, and on awaking partook of a hearty dinner.

On the morning of the 24th, we found that tenderness at the seat of the wound during the night had prevented him from enjoying a full amount of rest; nevertheless, he appeared better. His pulse was 104; his appetite good, and his tongue much cleaner. Some opiate pills were ordered to procure sleep. The tube was re-introduced, but on withdrawing the plug a little fœtid air only escaped. It has since remained in the chest, and for about a fortnight a pint of pus was daily discharged; at first partly through the tube and partly by its side, latterly through the tube alone. From that time to the present the discharge has lessened to about one half. For a few days after the air was admitted freely into the chest, the discharge was extremely offensive, but since the air has been again in a great measure excluded, it has lost much of its disagreeable odour.

On the 25th, the third day after the operation, the tongue was perfectly clean. As illustrative of the effect of the operation on his digestive organs, I may mention, that on that day he ate for breakfast two eggs and three slices of bread. At noon he had another slice of bread and a glass of wine. At four, nearly a pound of mutton, and a proportionate amount of bread and potatoes, and a pint of water; and in the evening more bread with his tea. His appetite has continued equally good up to the present time.

After a fortnight the porter began to act on his bowels, and the diarrhœa, which had lasted three or four days before I was informed of it, greatly retarded his progress. His pulse is now a little below 100; his breathing 25; and his strength, which was very much impaired at the time of the last operation, has somewhat increased, notwithstanding the exhausting effect of the discharge and the diarrhœa combined. He usually sits up for three or four hours every day. Nevertheless it must not be concealed that he is very much emaciated, and that any unlooked-for addition to the debilitating agents already at work would place his life in immediate jeopardy. I have good expectation, however, that his strength will increase more rapidly in proportion as the discharge becomes diminished, and that the constitutional improvement will prove more permanent than before, in consequence of the different organs being exempt from that injurious pressure, which, I am satisfied, was the cause of relapse on the two last occasions.

If it proceed, we may hope that while the walls of the right side of the chest collapse over the diminished volume of their contents, that the lung will at the same time at least partially unfold itself, the air gradually penetrate its substance, and absorption go forward in any bands of lymph which may oppose its expansion. It is probably too much to expect that this will take place to any great extent, or that the lung will ever with much efficacy perform its important functions. Nevertheless, what nature is unable to effect on the one side, she will compensate for on the other, and an irreparable injury done to the right lung may be counterbalanced by a fuller development of the left. Thus, after a while, the system at large may not be much a loser.

This, however, will require time; and ere it be accomplished the patient's strength may be found inadequate to the long-continued demand upon it, or some new disease may arise, or some incipient one be matured, to interrupt the work, and thwart this desirable end. I am far, however, from regarding the success of the operation as at all dependent on the patient's future progress. We have some reason to expect an ultimately favourable termination (and such a termination, doubtless, would greatly enhance the value of the means mainly instrumental in bringing it about): but should it be otherwise, the great advantage already derived will amply repay us for our trouble, be more than an equivalent to the patient for the trifling suffering by which the benefit was secured, and fully establish the propriety of the operation.

The case appears to me to be chiefly interesting—

1st. On account of the large amount of effusion. The quantity discharged at one time was a gallon, and the whole hitherto cannot be much under five.

2nd. On account of its complication with pneumo-thorax, of doubtful connexion with phthisis.

3rd. On account of the exceeding mildness of all the symptoms which accompanied the early formation of the matter, constituting what has been termed the latent form of the disease.

4th. As showing the local character of the disease, and the entire dependence of severe constitutional disturbance on the pressure of the fluid, and consequently the inutility of attempting by mere medicinal agents either to cure the one or to allay the other.

Lastly. As exemplifying the facility with which, and the extent to which the removal of the fluid may be effected without the admission of air (a matter of much importance in more recent cases where the lung is capable of expanding), and the great and immediate, and possibly permanent benefit which sometimes follows an operation when performed under circumstances apparently very unfavourable.—*Med. Gazette, April* 5, 1850, *p.* 598.

91.—*Case in which the Larynx of a Goose was Impacted in the Trachea of a Child.* By Dr. Burow.—The children in Dr. Burow's vicinity are very fond of blowing through the larynx of a recently-killed goose, in order to produce some imitation of the sound emitted by this

animal. When given to them for that purpose, it has usually ten or twelve rings of the trachea connected with it. A boy, æt. 12, while so engaged (Nov. 1, 1848), was seized with a cough, and swallowed the instrument; a sense of suffocation immediately ensued, which was, after a while, replaced by great dyspnœa. Dr. Burow found him labouring under this eighteen hours after, his face swollen, of a bluish-red colour, and covered with perspiration. At every inspiration, the muscles of the neck contracted spasmodically, and a clear, whistling sound was heard; and at each expiration, a hoarse sound, not very unlike that of a goose, was emitted. As, on passing the finger down to the *rima glottidis*, it was found closed, Dr. Burow felt convinced (improbable as, from the relative size of the two bodies, it seemed) that the larynx of the goose had passed through it. Tracheotomy was at once performed; but, owing to the homogeneousness of structure of the foreign body and of the parts it was in contact with, the greatest difficulty existed in distinguishing it by the forceps. Moreover, so sensitive was the mucous membrane, that the instant an instrument touched it, violent efforts at vomiting were produced, and the entire larynx was drawn up behind the root of the tongue. At last, after repeated attempts, Dr. Burow having fixed the larynx in the neck by his forefinger, so that it could no longer be drawn up on these occasions, he contrived to remove the entire larynx of the animal. The child was quite well by the ninth day. Dr. Burow says that it was a matter of great congratulation for him that many pupils were present during this operation, and thus able to confirm the correctness of a statement so incredible as to stand much in need of such confirmation. ('Casper's Wochenschrift.') *Brit. and For. Med. Chirurg. Review, Jan.* 1850, *p.* 260.

ALIMENTARY CANAL.

92.—ON THE TREATMENT OF IMPERFORATE ANUS.

By John Erichsen, Esq., Assistant-Surgeon to University College Hospital.

[Almost every case of this malformation will require treatment in some degree special. The following observations of Mr. Erichsen apply to cases in which the anus is imperforate, and the lower part of the rectum absent to a greater or less extent. Mr. E. says,]

In these cases three courses present themselves to the surgeon.

1st. The colon may be opened in the left iliac region.

2ndly. It may be reached in the left lumbar region; and,

3rdly. An opening may be made into it through the perinæum.

The only advantage that the iliac incision, or Littré's operation, presents is, that it is an operation easy of performance, and that whether the surgeon reaches the colon or not, he is certain to hit upon some part of the intestinal tube, which may be drawn forwards, and opened.

The objections to this operation are, the inconvenient situation of the

artificial anus; the great danger that must necessarily result from wounding the peritonæum; the chance of not finding the sigmoid flexure, and, as has often happened, of being obliged to open that portion of the small intestine which first presents itself.

The mortality after this operation is very great. Amussat states, that of twenty-one children thus operated on, only four ultimately recovered; and it is worthy of remark, that all the successful cases occurred in the town of Brest.

The lumbar incision, or Amussat's operation, has not as yet, to my knowledge, been practised on an imperforate child.

The advantages of this operation consist, not only in the artificial anus being situated at a more convenient spot than in Littré's operation, but more especially in the possibility of opening the colon in this situation without wounding the peritonæum.

The objections to this operation, as applied to imperforate children, lie in the frequent co-existence of malformation or malposition of the colon, with absence of the rectum, and in the impossibility, in many cases, of determining, before proceeding to operate, whether the anus is only occluded by a membranous septum, or whether the rectum is absent as well. If it could be ascertained beforehand, that though the rectum be absent, the descending colon occupies its normal position in the left lumbar region, I think it probable that the lumbar incision would be attended with less danger than any other operation that could be practised; but in the absence of this knowledge, it would scarcely appear to be justifiable to have recourse to it, as the colon might not be found, and the anus might merely be occluded by a dense membranous septum.

The perinæal incision has the advantage of being in the natural situation of the anus, and of being easily practised, and perfectly successful in all those cases in which the anus only is imperforate, the rectum being present. It is in those cases only in which there is congenital absence of the rectum that this operation is difficult of performance, and uncertain in its results. If it could be ascertained before proceeding to operate that the rectum be absent, it might be wiser to search for the bowel in the lumbar region. But as the surgeon has no means of ascertaining, before making his incision, whether the rectum be one inch or three inches from the surface, he must cut into the perinæum in order to obtain this necessary information; and if once he has penetrated to such a depth as to get beyond the levator ani muscle, or into the deep fasciæ in this situation, a great portion of the immediate danger of the operation will have been incurred, and few would think it advisable to leave the perinæal operation unfinished, and expose the child to the additional risk of opening the colon in the lumbar region.

There is one point in connexion with the perinæal operation to which it is of much importance specially to attend, not only as respects the immediate result of the operation, but as regards the ultimate success of the procedure—I mean, the bringing down of the mucous membrane of the gut, and fixing it to the lips of the external wound. Unless this be done, the line of incision between the termination

of the gut and the aperture in the integments will degenerate into a fistulous canal, which, like all fistulæ, will have a tendency to contract, and will be a source of endless embarrassment to the surgeon and to the patient. If the mucous membrane can be brought down to, and fixed at the opening in, the integument, this source of inconvenience will be removed, and the patient will be saved all that danger which results from the passage of the meconium over a surface of recently incised cellular tissue. This, however, can only be done when the intestine terminates at a short distance from the surface. If the perinæal incision be two or three inches in depth, there would be little probability of the surgeon being able to bring the intestine down to such an extent.—*Lancet, Feb.* 23, 1850, *p.* 236.

93.—*On the Treatment of Internal Piles.* By Prof. SYME, Edinburgh.—The disease usually called "prolapsus ani," and which is in general attributed to deficiency in the contractile force of the sphincter, depends merely upon a morbid enlargement of the lining membrane of the bowel, which always admits of being easily, safely, and effectually remedied through the use of ligatures. When I began to advocate this mode of treatment—more than twenty years ago—internal hemorrhoids, as the growth in question may more properly be designated, were regarded with the greatest dread as subjects of surgical treatment, hemorrhage from cutting being no less apprehended than the inflammation from tying, so that the late M. Dupuytren felt justified in recommending the actual cautery, notwithstanding all the horrors of its application, especially to such a part of the body, as the most expedient means of affording relief from the complaint. The danger of excision has certainly not been overrated, whether the hemorrhage attending it, or, what is still more formidable, the risk of inflammation excited by it, be taken into account. In the latter way valuable lives are lost every year, and the popular dread of interference maintained. But the ligature, when properly applied, is *perfectly safe* and *effectual:* the conditions being, as I have all along explained, that the whole of the diseased growth or growths should be comprehended, and that the threads should be drawn so tightly as not merely to strangle, but completely to arrest all circulation through the hemorrhoidal texture. It may be added, that this method is attended with less pain, either at the time or subsequently, than any of the others which have been proposed. Patients labouring under what is commonly called "prolapsus," may, therefore, be comforted with the assurance, that they may throw aside their uncomfortable bandages, and submit themselves to surgical treatment, in full confidence of obtaining complete relief. The true "prolapsus," or descent of the rectum, from weakness of the sphincter, and independently of disease in the coats, is comparatively a very rare infirmity; but, when it does occur, may still admit of remedy, by a different mode of procedure.

J. H., aged 28, was recommended to my care, in the month of November last, by a gentleman who felt interested in his welfare. He had been for a long while in bad health, and had tried a variety of means, with partial relief, but no permanent benefit.

Suspecting, from the peculiar complexion of his lips, and countenance in general, that he was suffering from the habitual loss of blood, I asked if he had any protrusion or bleeding from the anus, and was informed that he suffered from both, but had never thought of saying so to his medical advisers, as he did not think there could be any connection between these local symptoms and his general derangements. I urged the propriety of an operation, and, with a view to its performance, sent him to the hospital.

Before taking him into the theatre where my lectures are delivered, I desired the efforts necessary for bringing the whole extent of the disease into view to be made, in order that the ligatures might be applied. But when he presented himself, instead of the hemorrhoidal tumours or tumour which had been expected, the whole rectum seemed as if turned inside out, forming a large cylindrical swelling, at least five inches long by ten in circumference, covered with bloody mucus. It was stated that such a protrusion took place every time the bowels were moved, and that the quantity of blood lost was often much more than we had seen. When the bowel had been returned, nothing could be discovered amiss with the anus, except that the skin surrounding it was unusually relaxed, and lay in numerous folds, radiating from the orifice. By means of scissors and forceps, I removed the whole of this redundant skin, leaving merely the thin bands that occupied the spaces between the folds, and then desired the patient to maintain the horizontal posture, without any intermission, even for the evacuation of his bowels—in accomplishing which he was especially warned against making exertions.

The protrusion never again appeared, and the patient, after remaining under observation for some weeks in town, returned to the country; whence, in reply to an inquiry as to his present state, he writes to say, that the local complaint is completely cured, and that his general health is greatly improved.—*Monthly Journal, March* 1850, *p.*242.

94.—ON CERTAIN IMPROVED TRUSSES.

By T. P. Teale, Esq. F.L.S., Surgeon to the Leeds General Infirmary.

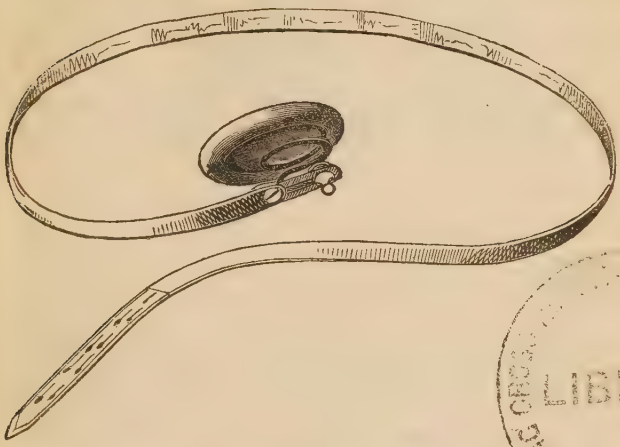
[These trusses, constructed for Mr. Teale, by Mr. T. Eagland, of Leeds, consist of an *elastic steel girdle, a hard pad* of varying form, according to the kind of hernia, and a *spiral spring* acting directly upon the pad; elements, which, existing in various trusses heretofore known, Mr. Teale has now combined in the construction of one. The trusses are thus described:]

The oblique inguinal truss.—The oblique inguinal truss consists of an elastic girdle of steel, to which is adapted a hard pad of oblongo-oval form, acted upon by a spiral spring.

By means of the elastic steel girdle the truss maintains a firm and steady seat upon the pelvis; by the hard pad of oblongo-oval form a firm support is given to the internal ring and inguinal canal, the external ring being left free; and, by the spiral spring, the pressure of the pad is directed perpendicularly upon the part requiring support, during the varied movements of the body. Through the medium of the spiral also, the *degree* of pressure exercised by the pad admits of being modified by

tightening or slackening the end of the girdle-strap, which is fixed to the button on the pad.

FIG. 1.



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The *girdle* is formed of a strip of elastic steel, rather more than half an inch in breadth, and of sufficient length to extend from the pad across the back of the pelvis as far as the haunch of the opposite side, from which point the girdle is prolonged by a leathern belt across the lower and front part of the abdomen, to be fixed to a button on the pad.

Although elastic girdles of steel are now in general use, it is rare to find one, in the various offices of surgical mechanicians, that is not faulty in construction; or, in other words, that secures to the wearer the full amount of benefit that it is capable of affording. The chief error consists in the portion of the girdle which is applied to the back part of the pelvis being made of a *straight* strip of metal bent towards the circular form, and representing a short *cylinder*. The only bearing which such a girdle exerts upon the back of the pelvis is by its lower border; whereas, if the girdle were constructed so as to represent a transverse section of a cone, it would adapt itself to the obliquity of the back of the pelvis, and would thereby secure a bearing upon this part by the whole of its internal flat surface. This advantage is secured, as I have elsewhere* shown at considerable length, by the form given to the steel plate of which the girdle is formed. Instead of being a *straight* strip of metal, the portion which is applied to the back of the pelvis should be cut in the form of a curve, the convexity of which is directed downwards (see fig. 2, *a* to *b*). When such a piece of steel is bent towards the circular form, it represents a section of a cone, the upper border of which

* Practical Treatise on Abdominal Hernia, by Thomas Pridgin Teale.

is shorter than the lower, and the flat surface has an obliquity corresponding to the obliquity of the back of the pelvis. The back part of the girdle being thus constructed, the truss is enabled to maintain a firm seat upon the pelvis; but, in order that it may exert a direct bearing upon the inguinal canal, it is necessary that the anterior portion of the steel girdle, which extends from the haunch to the pad, should describe a moderate curve with the convexity upwards (see fig. 2, *b* to *c*). By bending this portion of the elastic girdle towards the circular form, its internal or applied surface acquires an obliquity facing upwards and backwards, and in this direction it exercises its pressure upon the pad.

FIG. 2.

This form of elastic girdle was adopted by the late Mr. Eagland, of Leeds, and has been used by his sons, Mr. Thomas Eagland, of Leeds, and Mr. Edwin H. Eagland, of London. I have seen trusses similarly constructed by other instrument makers; but in too many instances, even in the present day, a straight strip of metal is the form of steel girdle employed.

The steel girdle is covered with leather, silk, or calico, and is slightly wadded on its internal surface.

The *pad*, for ordinary cases of oblique inguinal hernia, should be of an oblongo-oval form, two and a half inches in length, and one inch and three-quarters in breadth. Ivory is the best material, being susceptible of a high polish, and being also a good conductor of heat, on which account it is cool to the wearer. In hospital practice, where the cost of the instrument is an object, a pad of box-wood steeped in linseed-oil may be substituted for it, or a boss of thin metal covered with a layer of leather. In young subjects, whose muscles are powerful, the pad should be of smaller size and greater prominence, for in them a more concentrated pressure is required. In old persons, whose muscles and aponeuroses are feeble, the pad should be larger and flatter. If the hernia has considerably dilated the inguinal canal, a pad of greater breadth and less convexity is to be used. When the posterior wall of the inguinal canal has been so much encroached upon, in consequence of the large size and long continuance of the protrusion, that the hernia is apparently direct, the form of pad hereafter to be described as applicable to direct inguinal hernia should be employed. The pad must be hollowed on its external surface, for the double purpose of giving it lightness and of allowing a recess for lodging the spiral spring when pressed home.

The *spiral-spring*, placed between the anterior extremity of the steel girdle and the pad, is made of steel wire thickly electro-plated: or, where the cost of the instrument is an object, varnished. The form of the spiral in the inguinal truss is oval, adapted to the form of the pad.

The terminal coil of the spiral, which is attached to the pad, is received into a narrow groove prepared for it in the concave surface of the pad. This mode of attachment between the spiral and the pad renders any other fastening unnecessary. An uniform pressure throughout the whole extent of the pad is thus obtained; and the spiral, acting as a universal joint, allows the girdle to adapt itself to the varying movements of the body without disturbing the pad.

The measure for this truss is taken by passing a string from the internal ring round the pelvis to the same point, care being taken that the course of the string is directed on each side along the depression between the trochanter and the crest of the ilium. The mechanist, in constructing the truss, allows one inch of additional length to compensate for the space occupied by the wadding. When a double truss is required, in addition to measuring the circuit of the pelvis it is necessary to note the distance from the internal ring on one side to that on the opposite.

The direct inguinal truss.—For the support of a direct inguinal hernia, or of an oblique inguinal hernia, which from long continuance has simulated the direct, it is necessary that the pressure of the truss should be chiefly exercised over the external ring. For this purpose a truss may be employed similar to the former, but with an egg-shaped pad, the larger extremity of which lies towards the pubes. In ordinary cases the pad may be two inches and a half in length, and one inch and a half in breadth towards its pubic end. The degree of prominence of the pad should be adapted to the particular case.

The spiral in this truss is circular, and is attached so as to act chiefly upon the pubic end of the pad.

The femoral truss.—The femoral truss, like the former trusses, consists of an elastic girdle of steel, and a hard pad of special form, acted upon by a spiral spring.

The elastic steel girdle is similar to that described for the oblique inguinal truss, except that its anterior portion, which extends from the haunch to the pad, should sweep in a course somewhat more descending. This portion of the steel girdle is usually about one inch shorter than in the inguinal trusses.

The pad of ivory, boxwood, or thin metal covered with leather, is of a triangular form, the upper border corresponding in its direction with Poupart's ligament, and the pubic border being parallel with the femoral vessels. The size of the pad which has been found best adapted to the generality of cases is one inch and one-third in the vertical direction. The greatest prominence of the pad should be near its upper and pubic angle, so that its pressure may be chiefly exercised upon the pubic compartment of the femoral sheath, immediately below Poupart's ligament. The proper form is given to the pad by slightly bevelling the upper and pubic edges, and by more freely bevelling the lower or iliac edge, the angles and apex formed by the union of these planes being freely rounded off. The pad should be hollowed on its external surface. The spiral spring, which in this truss is of a circular form, is attached towards the upper and pubic end of the pad, so as to act more especially on its most prominent part.

A pad thus constructed gently closes the external aperture, namely,

the saphenous opening, but its chief pressure is directed to the pubic side of the femoral vein. The large vessels are thus subjected to as moderate a degree of pressure as is consistent with the support of the hernia, and the pressure is concentrated upon the part which more especially requires support. It is of the utmost importance that the pad of the femoral truss should be of *small* size. If its dimensions materially exceed those stated above, the pad is constantly liable to displacement from the action of the psoas and iliacus muscles on one side, and the pectineus on the other.

The hard pad and spiral spring are equally applicable to the umbilical and other trusses.—*Med. Gazette, Feb.* 1, 1850, *p.* 194.

95.—*Case of Intestinal Obstruction, for which an Operation was Performed.* By JOHN ERICHSEN, Esq., Assistant Surgeon to University College Hospital.—[The reader will find the subject of intestinal obstruction, with the question of the propriety of operative interference, fully discussed in 'Retrospect' Vol. XVII, p. 195, and Vol. XIX, p. 201, in observations by Mr. Phillips, Mr. Hilton, Dr. Bright, and others. We quote now an interesting case by Mr. Erichsen, in which the abdomen was opened in the median line, and the obstruction was relieved; though, unfortunately, the case terminated fatally. The patient was of the male sex, 52 years of age, and of spare make. The general symptoms were of the usual kind,—pain, distension, complete obstruction, fæculent vomiting, great general distress, &c. The attack commenced on the 6th of January, and Mr. Erichsen was sent for on the 12th, Drs. Bentley and Peacock having been in assiduous attendance in the meantime, and having tried all the usual means. An operation having been determined on, the question was, whether to make an artificial anus according to Amussat's plan, or to open the abdomen in front, and seek for the obstruction: and as the symptoms did not point distinctly to the large intestine as being the seat of obstruction, the latter alternative was adopted. Accordingly, at 9 a.m. on the 13th instant, chloroform having been administered, Mr. Erichsen proceeded to operate. Mr. E. thus describes the operation, and the subsequent progress of the case:]

Taking my stand between the legs of the patient, an incision was made from the umbilicus to within an inch of the pubes, as nearly as possible in the mesial line. Owing to the unequal tension of the abdominal parietes, the sheath of the left rectus was slightly opened; a small incision was then carried through the linea alba, and the peritonæum carefully opened. This membrane was then slit up on a broad director, to an extent corresponding to that of the external incision. Immediately on this being done, large round coils of tensely distended intestine, tolerably healthy in appearance, being but slightly injected, protruded through the aperture, curling over its sides, and overlying the abdominal walls. The intestines pressed forward so forcibly through the aperture, that it was found necessary to enlarge the incision upwards in order to admit the hand, to make a proper exploration of the contents of the abdomen. This was accordingly done, to an extent of about one

inch and a half above the umbilicus, by means of a probe-pointed bistoury, guided by the forefinger of the left hand. A careful search was now made for the seat of obstruction.

Lying directly across the line of incision, from left to right, was seen a long coil of contracted and empty intestine, that was recognised with some difficulty, on account of its abnormal situation, to be a portion of colon. It was contracted, and apparently contained neither fæces nor flatus, being perfectly empty. On this being drawn to the left side, the transverse colon and cœcum, greatly distended, were brought into view, as well as numerous coils of tympanitic small intestine. From the distention of the small intestine, of the cœcum and the transverse colon, it was evident that the cause of obstruction existed at some point below the termination of the transverse colon. The distended small intestine was therefore drawn to the right side, and a careful examination of the left side of the abdominal cavity proceeded with.

On passing the hand into the left lumbar region, it was found that the distention of the transverse colon suddenly ceased here, and I found it impossible to trace clearly the continuity between the transverse and descending portions of the colon. The sigmoid flexure of the colon formed a long convolution, stretching from the left lumbar region downwards, and across the abdomen to the right of the umbilicus; it then made a sharp curve, passed above and somewhat behind the apex of the bladder, returned to the left lumbar region, and then terminated in the rectum. This convolution, which was long and floating, stretched therefore across a portion of the abdomen, obliquely from left to right, and lay before and to the right side of the rectum. The whole of this portion of the colon, as well as the rectum, was contracted and perfectly empty, forming a striking contrast with the condition of other portions of the intestinal canal. It was now evident that we had to do with a case of volvulus, dependent upon a preternaturally elongated sigmoid flexure of the colon, making a half turn upon itself, by falling over towards the right side, so as completely to occlude its calibre, where it was tightly bound down in the left lumbar region by the reflected peritoneum.

An attempt was now made to rectify this volvulus, by drawing the elongated colon to the left side, and pulling it downwards, at the same time that an O'Beirne tube was passed up the rectum. There was some difficulty, even when the abdomen was opened, in working the tube inch by inch, and by drawing the intestine over its point, along the double curve formed by the elongated colon; but this was at length effected, the twist was obliterated, and flatus passed through and by the side of the tube. The intestines were now replaced, and a number of points of interrupted suture were inserted, bringing the edges of the incision into close approximation. Long strips of adhesive plaster were placed across the abdomen, which was further supported by a napkin pinned tightly round the body. The patient, who was a good deal exhausted by the operation, which had lasted about an hour, was then put to bed, and had two grains of opium administered. He remained tolerably quiet, free from sickness and uneasiness, until five p.m., when he passed a fluid feculent motion, with much flatus. This gave him considerable relief,

and he spoke cheerfully of his condition. He had taken some beef-tea during the day, which he retained on the stomach, there having been no return of the vomiting after the operation.—Eight p.m.: He passed another fluid, feculent, and copious motion; expressed himself much relieved, but almost immediately afterwards sunk back on the pillow and expired.

Examination of the body, twenty-five hours after death. (Present, Dr. Peacock and Mr. Filliter.)—On opening the abdomen, the peritoneum lining the interior abdominal wall was found roughened and injected; a small quantity of sanguinolent serum was contained in the cavity of the abdomen. The stomach was of unusually large size, but healthy. The small intestines were slightly inflamed in patches on the serous surface. On laying them open, they were found to be pervious throughout, but contained a quantity of viscid, tenacious, grey mucus, identical with that which had been vomited. The mucous membrane was healthy. The cœcum and transverse colon presented a remarkable contrast to their appearance during the operation, being now empty and comparatively contracted. The sigmoid flexure of the colon was healthy, as far as its structure was concerned, with the exception of being perhaps slightly thickened. The same remark applies to the rectum. The elongation of the sigmoid flexure was now well seen, as it hung downwards before and to the right of the rectum; it was loose and floating in the cavity of the abdomen, having a long mesocolon. It presented three sharp curves or angles,—one at the junction of the transverse colon with the descending convolution; the second, at the junction of the descending and ascending convolutions; and the third, at the point where the ascending convolution terminated in the rectum. The seat of obstruction, which was now, however, entirely removed, had been at the first of these curves,—viz., the junction of the transverse colon with the descending convolution. The mechanism of the obstruction was obvious. The end of the transverse colon was tightly bound down to the abdominal wall, in the left lumbar region, by reflected peritoneum, and this part, firmly and immovably fixed, terminated at an acute angle in the loose, and floating, and preternaturally elongated sigmoid colon. So long as the convolutions of the sigmoid colon hung downwards and to the left side, there was no difficulty in the passage of fæcal matters into them from the transverse colon; but if the sigmoid convolution were tilted over to the right side, and at the same time thrown slightly upwards, that portion of the colon which remained firmly fixed in the left lumbar region became occluded by the twist that was occasioned by the tilting of the elongated sigmoid flexure. The length of the large intestine, from the cœcum to the anus, was six feet ten inches. The cœcum, transverse colon, and rectum, were of their normal length, the preternatural elongation being confined to the sigmoid flexure of the colon. Both kidneys were found in a state of granular degeneration. The other abdominal viscera were healthy.—*Lancet, Jan.* 26, 1850, *p.* 108.

96.—ON ASCENDING OR INTERMUSCULAR HERNIA.

By James Luke, Esq., Surgeon to the London Hospital.

There is a variety of inguinal hernia apparently not generally known to surgeons, which I venture to designate as ascending or intermuscular, (for reasons which will appear in the sequel), to which I am anxious to draw attention, from the circumstance that it is liable to cause some difficulty in diagnosis, and, when strangulated, to become a matter of more than usual interest and occasional embarrassment.

To illustrate the subject, it is proposed to relate a few cases, which partake of the same general character, although they exhibit modifications of sufficient interest to be noticed in the description. Before relating those cases, I propose to give some account of the form of hernia to which they relate, that a clearer understanding of its mode of formation may be obtained. In doing so, it will be needful to recal to the recollection of the reader the relations which a hernia, in the most common form, bears to the inguinal rings and canal through which it descends, because the immediate subjects of this communication are examples merely of deviations from those relations.

It will be remembered that an inguinal hernia of the ordinary kind, after issuing from the abdomen through the internal ring, *descends* in the inguinal canal in front of the spermatic cord in the male, and of the round ligament in the female, from whence it passes through the external ring to the scrotum in the former, and to the pubes in the latter.

A hernia, however, at its exit from the abdomen, is liable to be pushed aside, or have its course altered, by any opposing obstacle; for its tendency is always to pass in that direction in which it meets with least impediment to its course. In the cases before us such impediments do occasionally arise, and more particularly in the female; a circumstance attributable to the lesser anatomical development of the canal and external ring in that sex, from which probably proceeds the more frequent occurrence of the form of hernia mentioned below. In the male sex the canal and rings are sufficiently large to allow of a hernial descent, so that we continually observe that the direction of an inguinal hernia in the male is downwards, unless it be turned aside, or its direction altered by artificial means, and especially by the pressure of a truss. In the female, however, natural obstacles occur in the downward direction; it therefore sometimes happens that the lesser impediments to the progress of a hernia lie in an upward or outward direction, in which case the tumour, after passing from the internal ring, turns towards the ilium, and becomes interposed between the layers of abdominal muscles above and on the outside of the ring. Such herniæ are covered anteriorly by the internal oblique muscle, and bear nearly the same relation to the tegumentary surface as an ordinary hernia confined to the inguinal canal, but differ materially from it in its relation to the internal ring. The tumour lies nearer to the ilium in this form of hernia, in a position which, being not usually occupied by hernia, may give rise to some difficulty in diagnosis, and may through inadvertance be mistaken for

some other disease, either of the cœcum on the right, or colon on the left side. It also lies somewhat buried, when small, under a covering of muscular structure, and occasionally under an accumulation of adipose tissue, and may on that account be passed over altogether without notice. In its position it constitutes the kind of hernia which I have named above.

[Mr. Luke then relates three cases of this form of hernia which have come under his observation. In two of these cases Mr. Luke operated for strangulation; and in the third case the hernia was found, on the post-mortem examination of a case for which the ordinary operation had been unsuccessfully performed. In all these instances the patient was of the female sex. Mr. Luke proceeds to observe:]

These cases, even in the female, are unfrequent; they are still more so in the male, and, I believe, never occur in that sex, unless produced by means wholly independent of anatomical formation and development. They may, however, be produced by other causes; and the subject has an important bearing upon the application of trusses to the relief of the ordinary kinds of inguinal protrusions. From the manner in which a truss is usually applied, and from the sufficiency in the size of its pad, both the internal and external inguinal rings are guarded, and the more especially when the two are approximated by the descent of the former, as is common in old hernia. But in an incipient hernia, when the rings are in their normal position, or nearly so, a truss may be so applied as to guard the external ring and lower part of the inguinal canal only. In that case the hernia is not prevented from protrusion through the internal ring, and its increase in size may continue, notwithstanding this imperfect use of the instrument. If such increase does take place, the truss has no other effect than to alter the course of the hernia by preventing its *descent* through the canal and external ring, and constraining it to take that direction which alone is open to it. That direction appears to be upward and outward; and thus the intermuscular hernia, as described above in the foregoing cases, is produced. To prevent such a form of hernia in a male, arising from the use of a truss, is an an important desideratum, and appears easily attainable by its proper application. As the occurrence is the result of pressure of the pad upon the lower part of the canal and external ring, while the internal ring remains unguarded, there are two courses open for selection. The one course is to remove the pressure of the truss altogether, by which means the hernia will have an opportunity of descending in its usual course: the other is to guard the internal ring also, and to prevent protrusion from the abdomen altogether. Of the two it need scarcely be observed that the last is to be preferred. Although this is generally done, it is not always so; and it may serve a good purpose to show what may take place, and what has taken place, from inattention to this deficiency in the application of trusses. They should always be so applied as to guard the *internal ring*.

An illustration of the above came under my notice a short time since, in the case of a gentleman, about 50 years of age, who first applied to me in consequence of some uneasy feelings which he experienced in the

abdomen, and irregular action of the bowels, attended by occasional flatulence and nausea. He also complained of pain in the region of the cœcum, in examining which and the adjacent part it was found that he was the subject of hernia. This had descended partially into the scrotum; but he had been in the habit for some years of retaining it by means of a truss. A much larger tumour occupied the space between the crest of the ileum and the usual seat of the internal ring, which, by the communication of impulse, was ascertained to be connected with the lower tumour. Thus it was found that the entire hernial sac was of very considerable dimensions, and contained a large mass of viscera. Probably to this circumstance was referable the symptoms of intestinal derangement which were the immediate cause of his application. It became, therefore, an object of primary importance in the treatment, that the contents should be replaced within the abdomen. In the attempt to accomplish the reduction the lower tumour was readily made to disappear; but, as it did so, the upper tumour became more full and large. Attempts at reduction of the upper tumour in the upward direction were wholly unavailing; but, when pressure was made upon it in a direction downwards, in the course of the inguinal canal, while the other hand was kept upon its lower extremity, so as to prevent the contents from descending through the external ring, it was, by a little manipulation, partially returned into the cavity of the abdomen. Old adhesions of the contents, either to each other or to the sac, appeared to be the obstacle to the reduction being complete. Sufficient, however, was accomplished to afford some relief to the patient, and the intestinal disturbance became less severe. Should strangulation occur in this case, the circumstances which complicate it are well calculated to try the skill of the most experienced surgeon who shall undertake an operation for its relief; all which complication, with all its present ills and prospective embarrassments, I think, might have been prevented by the proper use in the right position, and at an early period, of an efficient truss.—*Med Gazette, March* 15, 1850, *p.* 458.

97.—CASE OF HERNIA REDUCED EN MASSE.

By James Luke, Esq., Surgeon to the London Hospital.

[The patient, a gentleman, æt. 77, was seen by Mr. Callaway on the 30th December, when he was suffering from vomiting, which he attributed to an error in diet three days previously. Mr. Callaway ascertained that the patient had been the subject of hernia, and that the hernia had descended on the 25th, and had been pushed up without difficulty. As no tumour could be felt, suitable medicines were prescribed. On the 1st January, no relief had been obtained, but the vomiting had become stercoraceous and hiccough had supervened. Mr. Luke gives the following further account of the case:—]

At this period, about ten a.m., I first saw the patient in consultation, at Mr. Callaway's request. He was then much exhausted, and his pulse low. He was rejecting everything from his stomach, and was suffering

from a peculiar kind of hiccough. I found the abdomen, as stated above, free from tympanitis, and pressure could be borne without inconvenience over the whole surface. A slight sensation of pain was caused by pressure above the left inguinal canal, but the most careful examination failed to detect any tumour or fulness within the abdomen or within the canal. On attending to the condition of the external ring and spermatic cord, important information was obtained. The ring was found sufficiently large to admit the point of the finger readily within it, while the cord, as it passes through, as well as below, the ring, *was clearly defined, and unobscured by any overlying hernial sac.* These circumstances led at once to the conclusion that the sac, which the previous history had informed us to have been present at no very distant period with the hernia when it descended, had been displaced from its former position, and had been returned into the abdomen, together with its contents. Thus a high presumption at least was established, that the hernia had been reduced en masse, while the existing symptoms justified the further conclusion that the hernia was in a state of strangulation. Supposing that we had sufficient data from which to form a correct opinion, we agreed to recommend an exploring operation, provided relief should not be obtained before three o'clock, at which time we proposed to meet again. In the meantime, calomel and opium were ordered.

At three o'clock the hoped for, rather than expected, relief had not been obtained, although the sickness had not been so urgent; but the exhaustion had increased.

The operation was now proposed and urged upon the patient, but his assent was steadily and perseveringly withheld, and much time was devoted to overcome his objections.

We again met at 10 p.m., and again urged the importance of avoiding delay, but with a result similar to the last.

2nd. During this day Mr. Callaway continued his attendance alone, in the latter part of which the exhaustion became much increased, and tympanitis made its appearance. The sickness, however, had ceased, but the constipation continued. At ten o'clock I again attended, having been informed that our patient would then consent to have the operation performed, as we had proposed, provided some castor oil which he determined to take in the afternoon should not have previously acted on his bowels. On examining the inguinal rings at this period, there appeared to be a slight tendency to hernial protrusion both on the right as well as on the left side, but on neither side was there any pain on pressure. Previous to this time attempts had been made to reproduce a hernial descent, by directing the patient to cough, strain, and walk about the room, without any hernia appearing, and upon this occasion the slight fulness rather than tumour at the internal abdominal rings on both sides receded immediately under the pressure of the finger without pain. As the castor oil had not acted on the bowels, after some further delay the requisite consent was obtained, and the operation proceeded with by pinching up a transverse fold of skin over the inguinal canal, and transfixing it with a knife in the ordinary way. This laid bare the abdominal tendon over the canal, on incising which the canal itself and spermatic cord were exposed. At this period a small tumour presented itself at

the internal ring, and became larger, or rather came more into view, as the incisions of the ring gave more freedom to it. The tumour was rounded in form and of a white appearance, but seemed to contain some dark substance within it. When a small opening was made into it, there issued some bloody serum, and when it was more freely opened, a portion of the discoloured intestine was brought into view; the discolouration, however, was not very great. A finger introduced along the surface of the intestine passed evidently into a hernial sac, at the upper part of which, and about two inches from the internal inguinal ring, a contracted part was detected encircling and strangulating the intestine. This contraction or stricture was clearly produced by the neck of the sac, but was not very tight. The point of the forefinger with some little difficulty was introduced within its grasp, and served as a director on which it was divided readily with a probe-pointed bistoury. After this was accomplished the intestine was carefully and easily reduced from the sac into the general cavity of the peritoneum, and the wound closed by two sutures, plaster, and bandage.

Ordered beef-tea in very small quantities at a time; opium if sickness should supervene. But if no sickness took place after the lapse of three or four hours, small doses of sulphate of magnesia, in peppermint water, were to be given, and repeated every three hours until the bowels were relieved.

3rd. There had not been any sickness, and the bowels had been freely open very shortly after the operation. Neither of the medicines ordered the evening before had been taken. There was some tympanitis and a continuation of the hiccough, but both were diminished. The exhaustion was also less. Ordered, more nourishment and some bottled stout.

4th, 5th, 6th. On these days there was gradual improvement in all particulars. The bowels had acted well, and the tympanitis and hiccough had passed away. On the 6th the wound was dressed and found to be nearly healed by adhesion. The sutures were removed.

8th. The patient thought the wound was healed, and the dressings were not changed. On this day, as he appeared convalescent, I ceased attendance.

[Mr. Luke states that this is the eighth case of reduction *en masse* which has fallen under his notice; and records his opinion that "hernial reductions *en masse* have been far more frequent than operations for their relief." He says:]

The importance of the above does not, however, depend so much upon the addition which it makes to the number of successful cases, as upon the clear and valuable light which it throws upon the diagnostic marks which distinguish such reductions en masse. In its perusal it will be observed that some difficulty was experienced, both by Mr. Callaway and myself, in obtaining a clear and satisfactory history, in consequence of the notion which the patient entertained that the hernia had nothing to do with his existing condition, while the same idea influenced his refusal to submit to the proposed operation. We had, therefore, in more than an ordinary degree, to depend upon the local signs for the diagnosis which justified our proceedings. The first and important material fact in the history which was clearly made out, was the previous existence

of a reducible inguinal hernia on the left side; and, less clearly, that it had been down five days before Mr. Callaway saw the patient, and had been then easily reduced. The point to be determined was, whether those local signs which usually remain after an ordinary reduction, still continued in the case under consideration, or had been removed by the easy reduction alleged to have been made. The local examination satisfied our minds that they had been removed, and hence our conclusion upon the case. The signs alluded to, are, the obscurity of the ring and spermatic cord, particularly of the last, caused by the continued presence of sac. Had the sac continued as in ordinary reduction, the fact would have been known by the obscurity of the cord, which it overlies—and the inference would have been drawn that the hernial contents had been reduced without the sac being reduced at the same time. But as no obscurity existed *after* the previously-ascertained descent of an hernia, the conclusion that the sac also had been reduced, together with its contents, seemed the only proper one to be drawn from the premises. The existing symptoms of intestinal obstruction also pointed to the high probability of strangulation being present, although the circumstance of almost immunity from pain at the part might have led to error if previous experience had not informed me in how mitigated a degree this symptom might appear, even when *severe* strangulation existed.

Mr. Reid, of Canterbury, among many judicious remarks appended to a case of partial reduction en masse, published by him in the 'Provincial Journal,' observes "The existence of deposition of fat in the cord often placed at the external ring, cysts of the cord, and varicocele, would cause a fulness and obscurity about it which could not be distinguished from that occasioned by the sac, with or without some portion of its contents." In these observations Mr. Reid is correct only in supposing that fat and cysts connected with the cord and varicocele produce obscurity of the cord, but he is not correct in asserting that obscurity from these causes cannot be distinguished from those arising from the presence of hernial sac, with or without some portion of its contents. It will be recollected that all the causes of obscurity referred to, other than those from sac, are intimately connected with the cord; indeed, so intimately as to follow all its movements. The hernial sac, however, does not obey the movements of the cord, and the difference in this respect affords a ready means of distinguishing the sac, when present, from those other causes of obscurity. The testicle, when drawn downwards, will be followed by the cord. The cord, in descending, carries the bodies which are intimately connected with it; but the descending cord does not much, if at all, affect the hernial sac.—*Med. Gazette, Feb.* 8, 1850, *p.* 236.

98.—*Case of Internal Strangulated Hernia, for which an Operation was Performed.* By Prof. SYME, Edinburgh.—[In connection with the above case, the following by Mr. Syme will be interesting.]

Upon the 13th of October last, I was asked by Mr. Sidey and Dr. Newbigging to see a patient, who appeared to be suffering from an internal strangulation of the bowel. He was a man about fifty years of age,

the butler of a family in town; stout in frame, and rather corpulent. For eleven years he had been troubled by an inguinal hernia of the right side, and had worn a truss to prevent its protrusion, until the last six weeks, during which he had not observed any swelling, although the bandage had not been used, in consequence of five months having elapsed without any appearance of it. At twelve o'clock of the preceding night, he had suddenly felt very ill, and sent for Mr. Sidey, who saw him at one o'clock in the morning, complaining of intense abdominal pain, with quick pulse, cold perspiration, and vomiting. Upon careful examination, a tumour, about the size of a hen's egg, was felt in the right iliac region, without any external enlargement or thickening of the parietes of the cavity. Leeches were applied, and several injections administered during the night, with some palliation, but no material alteration, of the symptoms; which continued much the same as they have been described, until we met about two o'clock in the afternoon—fourteen hours from the commencement of the attack.

As there could be no doubt that strangulation of the bowel existed, we examined the suspected region with all the care in our power, but, probably from the abdomen having become more distended, without being able to detect the tumour which had been felt the night before. All that we could perceive was a slight degree of induration or resistance, opposite the internal ring, over a space not much larger than the point of a finger. In these circumstances I should not have felt justified in undertaking any operation, unless Mr. Sidey's accuracy of observation had been well known to me, and, in absence of any positive information that could be obtained at the time of our examination, rendered his detection of a tumour in the first instance sufficient ground for surgical interference.

Having placed the patient in a convenient position, I made a free incision of the integuments throughout the whole extent of the inguinal canal, tied the superficial epigastric artery, which had been cut, inserted my finger through the external ring, and guiding upon it a probe-pointed curved bistoury, divided the aponeurosis of the external oblique, up to the internal opening for the cord. There being still no appearance of a tumour, but a more distinct feeling of resistance, I divided the other coverings of the cord, and brought into view a dark-coloured mass, at the internal ring. Pulling this toward me, I readily drew out a hernial sac, about the size of a hen's egg, which, being opened, was found to contain a portion of the small intestine. Searching for the stricture, I encountered a difficulty from the sac yielding to the slightest pressure, and returning with its contents into the abdomen. I, therefore, seized it with a pair of forceps, and thus obtained the requisite tension, until I succeeded in passing the edge of my nail beyond the stricture, and guiding the bistoury upon it, effected the dilatation necessary for accomplishing reduction of the strangulated part. The patient was speedily relieved from all his distress; and, although a very unfavourable subject for any operation, through the kind and judicious management of Mr. Sidey, recovered completely, and is now quite well.

There seems to be considerable difficulty in satisfactorily accounting for the strangulation. It was evidently caused by the neck of the sac;

but whether the hernial pouch had remained empty until the symptoms were produced by the entrance of intestine, or whether the contents had previously been in a state of incarceration, is a question that admits a difference of opinion. Mr. Sidey informs me that, about three weeks before the operation, the patient suffered for two or three days from colic pains, but not of such a character as to suggest the suspicion of hernia; and the stricture was so extremely tight that I can hardly suppose the intestine could have been imprisoned, without affording signs of being so.

This case will, I trust, afford encouragement to operate for the remedy of hernial tumours, reduced in a state of strangulation; and may also be regarded as possessing some interest from being, so far as I know, the only instance of recovery from a hernia which has become strangulated within the abdomen.—*Monthly Journal, Jan.* 1850, *p.* 1.

99.—ON THE OPERATION FOR STRANGULATED HERNIA.

[A writer in the 'British and Foreign Medico-Chirurgical Review,' criticising Mr. Hancock's pamphlet on this subject, (see 'Retrospect,' vol. xx. p. 157,) thus states the points at issue in the controversy:]

The most usual mode of performing this operation is, by laying open the peritoneum which forms the sac, and then dividing the stricture. For reasons to be presently stated, some surgeons have thought right to deviate from this practice, and to adopt, as a general rule, the division of the stricture external to the sac of investing peritoneum, which surrounds the strangulated gut or omentum. This plan has received the distinguishing appellation of Petit's operation; though it dates its origin to a time prior to its advocacy by that surgeon.—The question is, which of these two modes of practice is to be adopted as the *general rule:* and it is right that we should here at once add, that the supporters of the 'new style' are not *exclusives;* though many who give a preference to the old plan, do so to the entire exclusion of the new. Our author belongs to the latter class. The question is, doubtless, one of grave importance; and the innovation (if we may so term it) has been countenanced by many good surgeons, who have had large personal opportunities of testing its value. It is not, however, so much of an abstract question, as, at first sight, it might appear. The information we require is, which is the safer operation in the hands of the many: and in the multitude are, of course, included those whose personal experience is comparatively limited, and who, therefore, cannot be expected to apply those delicate tests in the diagnosis of individual cases, which such men as Mr. Key and Mr. Luke could do. We believe, in short, that the operation without opening the sac may be regarded as the preferable alternative by surgeons of large experience, who are fully alive to the fact that, in the ordinary routine of practice, the exceptions may embrace a much more numerous class of cases than the rule; but we have as little hesitation in regarding the older plan of opening the sac in all cases, as a more certain and less dangerous course, to be pursued by surgeons, to whose lot it falls only

occasionally to perform this serious though simple operation. This view has not been taken by writers on the subject, who have treated it as involving only the abstract question of which is the preferable method as a general rule of practice; and the advocates of each plan have considered that their statistics have borne out their several opinions. A review of these, and of the whole subject, has satisfied us that the consideration we have just pointed out constitutes, in a practical point of view, an important element in discussing the question.

[The writer proceeds to state the objections to the ordinary operation:]

Peritoneal inflammation consequent on exposure and handling of the contents of the sac, and admission of air into the serous cavity; hemorrhage; risk of wounding the intestine, or of rupturing it by drawing it down to examine its condition at the seat of stricture; extreme prostration; danger of disorganization from exposure.—The validity of these objections, as a whole, is first questioned by Mr. Hancock, who regards the exaggeration of the danger attending the usual operation by the advocates of Petit's method, as fraught with mischief; inasmuch as it tends to perpetuate the system of delay which has acted so prejudicially in augmenting the calendar of fatal cases. In this opinion we concur. Simple delay each hour diminishes the chance of the patient's recovery; and when we have superadded to this negative cause, the positive injury done to the intestine by violent and prolonged taxis, with the additional agency of stimulant cathartics upon the mucous and muscular coats of the bowel, we may fairly anticipate that the "last resource" will fail. In this respect, then, we think it is a favourable point in the newer operation, that it induces the surgeon to propose, and the patient to submit, at an earlier period, to operative interference; and if the operator be only prepared, by previously acquired tact and knowledge, to discriminate whether it is safe to complete the operation without opening the sac, he may safely adopt Petit's method as his general rule; always bearing in mind as we have already remarked, that the exceptions to such rule are very numerous. Mr. Key attributes the usual fatality of the ordinary operation to exposure of the inflamed or strangulated portion of bowel. Mr. Hancock says, that comparatively few patients die of simple peritonitis after this operation, and supports his opinion by referring to his own experience, with statistics, adduced (for other purposes) by Mr. Gay, and by the fact that the "amount of mortality is not in the same ratio as the extent of intestine exposed." It is quite true, that small herniæ excite generally, the most urgent symptoms; but this is because they are generally recent, and the ring through which the gut descends is contracted; the stricture, in consequence, is generally tighter in these cases, and the intestine more susceptible on its first protrusion. We do not, therefore, attach much weight to this remark of our author. But it is certainly true, that a large old hernia may be often exposed and roughly handled, without the same risk which attends a similar exposure of one of recent descent; and, for this and other reasons, we are disposed to regard Petit's operation as more applicable in recent than in old ruptures. There is less probability of adhesion on the one part, and less risk from exposure of the contents of the sac on the other.

Again, is the incision of the peritoneum fraught with the risk attributed to it. Mr. H. thinks not, when the serous membrane is already in a diseased condition; and considers that the position is proved by the impunity with which the large abdominal sections for ovariotomy are made. The operation for paracentesis abdominis, and the removal of large portions of omentum, are also regarded as affording confirmatory evidence on the same point. We are not prepared to go the full length with Mr. Hancock in this opinion. If inflammation is less likely to occur in some of the instances he has adduced, it is rather because the system generally is less prone to destructive forms of inflammation when partially prostrated by disease, than where the frame is suddenly subjected to a severe injury, involving an important serous membrane, such as is the peritoneum. But, be this as it may, we have no hesitation in ascribing infinitely more importance to the prolonged pressure by the ring of stricture upon the strangulated intestine, than to the small and clean incision which is required to liberate the gut; and, if there be no unnecessary handling, the general sac of the peritoneum need be very little interfered with.

[The following are given as the most important of Mr. Hancock's deductions:]

"1. That opening the sac does not increase the danger of the operation, but it is to be preferred as the safer mode of proceeding. 2. That comparatively few cases die of simple peritonitis after the ordinary operation. 3. Incisions made into the peritoneum, with a view to relieve an inflamed condition of that membrane, are calculated to diminish, not augment, the inflammation. 4. Rapid depression of the vital powers, with death, are not to be attributed to opening of the sac. 5. The risk of wounding the intestine is less in the usual, than in Petit's operation. 6. Petit's operation, not being applicable to all cases, exposes the patient to the danger attending error of selection. 7. The practice of exhibiting purgative medicines before operating for strangulated hernia, with a view to the liberation of the gut by its own movement, is improper. 8. The successful cases treated by Petit's operation would have been equally successful under the usual treatment; a very large number of those in which it failed might have been saved, had the sac been opened. 9. The employment of chloroform should supersede the necessity of warm bath, bleeding, and tobacco, in the treatment of strangulated hernia. 10. The injurious effect of purgative medicines, after the operation for strangulated hernia, are shown by the increased urgency of the symptoms, and the fatal results attendant upon their exhibition."

These, (says the reviewer), strike us as the most important amongst a more detailed list of deductions enumerated by our author. We shall not reiterate our comments on these inferences, but merely state our own conviction, as based upon personal observation, and upon the experience of others. It is this:—Petit's operation may be kept in view as the preferable alternative, when there is no contra-indication; but we believe the ordinary operation to be that which is applicable to a great majority of cases, including all forms of hernia. We regard Petit's operation as specially applicable to the femoral form of hernia; also to cases in which

the rupture is of recent descent, or, if old, when it has been small and easily and entirely reducible. Further, it is specially applicable to cases in which the symptoms of strangulation, though acute, have been but of short duration. We deprecate, with our author, the use of purgatives before operating, and their early use afterwards. We entirely eschew tobacco; have but little faith in the warm bath or bleeding in aiding the taxis; and regard chloroform as a valuable substitute for both; indeed, hernia and dislocation may be included in the same category in making this remark. Lastly, we approve of opium in most cases, and in many, of calomel in addition, in the after-treatment of patients who have been subjected to operation.

[The reviewer concludes with the following observations on the mode of applying taxis. The method which he proposes is certainly ingenious; but, though he declares his complete confidence in its success, it will be observed that he does not state positively whether he has seen it tried. It is obvious that experience alone could determine the practicability of the operation.]

A moment's reflection as to the mode in which pressure is applied to a strangulated mass of intestine or omentum, with a view of forcing it through a narrow canal, must at once render obvious to the operator at how great a mechanical disadvantage he is acting; how much better it would be, if he could pull it through from the opposite side. Let the experiment be made with a truncated funnel, filled with intestine, and let the experimenter first try to *push* the gut through, and then reverse the application of the force, by attaching a string around it, and *pulling* it through. Is it impracticable to imitate this latter and far more efficient method, that of traction? We think not. Let the patient's thighs be flexed and rotated inwards; then let an assistant, standing over the patient, raise him or her by both legs, until the whole trunk is fairly lifted from the bed, and the whole weight is thrown upon the shoulders; the pillow having been previously removed from under the head. This posture must be maintained for a short time, and then the buttocks gently lowered and raised again, the surgeon the while keeping his hand on the hernial tumour, and *gently* aiding by taxis the return of the bowel. Such assistance on his part will often not be required, even where the stricture is a tight one, and much pressure will tend to interfere with its success. These remarks apply especially to small, recent, and, of course, reducible herniæ; and to femoral, rather than to inguinal. If it fail in such, we should at once desist from any more forcible use of the taxis, being satisfied that it would prove unavailing. The rationale of its success appears to be, that the whole mass of small intestine within the abdomen, of which that in the sac is but an offset, is thrown upwards towards the diaphragm, and must, unless the resistance of the stricture be too great, draw the incarcerated portion with it. Of its success we have no doubt; and cannot too strongly urge its general adoption, in place of the coarse and cruel handling to which recent herniæ are too generally subjected, to the great present anguish of the patient, and his greatly deteriorated chance of surviving an operation if afterwards called for.—*Brit. and For. Med.-Chir. Review, April* 1850, *p.* 482.

100.—ON THE IMPACTION OF FOREIGN BODIES IN THE ŒSOPHAGUS.

By J. Adams, Esq., Surgeon to the London Hospital.

[A man, while hurriedly partaking of roast goose, felt something stick in his throat. He applied to a surgeon, who employed a probang forcibly, and as he passed it down to the cardiac opening, the foreign body was presumed to be pushed into the stomach. No relief, however, was obtained by this means, nor was any by the subsequent employment of an emetic of sulphate of zinc. The difficulty of swallowing becoming greater, and considerable dyspnœa also occurring, the patient was taken to the London Hospital.]

Mr. Adams happened to be in the hospital at the time; and, on hearing the nature of the previous symptoms, had the patient seated on a low chair, with his head thrown back as much as possible, and then cautiously passed a whalebone rod (to the end of which a small brass hook was connected) along the back of the pharynx into the œsophagus. The foreign body was immediately detected about two inches below the level of the cricoid cartilage, and was slightly detached; but, on the second introduction of the instrument, it was completely withdrawn to the back part of the fauces, so that it could be removed from the mouth by the fingers. It was found to be an irregular-shaped portion of the scapula of a goose, measuring nearly one and three-quarter inches in each direction, and lying vertically in the long axis of the œsophagus. Instant relief was of course afforded, and the patient ordered to keep himself quiet at home for a day or two.

[Mr. Adams made the following remarks on the treatment of such cases:—]

The importance of these cases is not entirely disproportionate to the alarm and anxiety felt by the patient or his friends, and in no class of cases are the beneficial results of prompt surgical treatment more immediately displayed. In the first place, we should never omit, under the most urgent circumstances, to make a few brief enquiries as to the nature of the substance supposed to be impacted; and, should it be a portion of meat, or any other non-irritating and digestible substance, the best practice would be to push it on forcibly into the stomach by means of a probang (or any instrument of the like nature we may have at hand).

I believe that all sharp or pointed bodies are most safely treated by retraction; and no more convenient or appropriate instrument can be contrived for the purpose than that which I employed. It is a solid rod of whalebone, about twenty-two inches long, and three-quarters of an inch in circumference in the centre, gradually tapering, however, to a point at each extremity; at one end is fixed a round piece of sponge, and at the other end a piece of watch-spring three inches in length, which is covered with silk, and connected securely to a flat blunt button-like hook, having a hole in the centre, for the attachment of some loops of silk, which are often found of great additional assistance in entangling projecting points of any foreign body; but it may so happen that, on ac-

count of some peculiar position which it may occupy in the œsophagus, the flat hook may pass by it repeatedly; still, it is impossible that any additional mischief can be effected by the employment of the instrument, which has often, I fear, been the case when the ball probang is invariably used; and, should repeated attempts with this instrument prove ineffectual, the surgeon must not be discouraged. An emetic of speedy operation has been by some employed with success, from the effects of which we may hope either that the foreign body will be completely expelled, or at any rate that it will have become sufficiently displaced for the hook to entangle it on a second attempt being made, and this, I believe, will generally obtain.

Let us briefly consider what are the dangers likely to arise from the forcible propulsion of foreign bodies onwards, if hard and irritating substances. The mucous membrane and muscular fibres of the pharynx or œsophagus may be extensively lacerated, and this accident would be far more liable to occur should any narrow substance be the offending matter; because, as the œsophagus would not be equally distended at the seat of obstruction, the mucous membrane would collapse above it, and would thus very easily become lacerated by the point of the probang. These lacerations may heal and no further mischief arise, or acute inflammatory action may supervene, terminating in diffused or circumscribed suppuration in the cellular tissue around, than which you cannot possibly imagine any cases more distressing to the patient, or perplexing to the surgeon. I well remember two cases which have occurred to me at this hospital during the past three years, a description of which may serve to impress the symptoms and treatment more forcibly on your attention. In both cases the impacted body was one of the small hard bones of the plaice, and in both the distress was extreme. The first case was brought to me as an out-patient, and occurred in a woman, who, it was stated, had swallowed one of these bones three days before. She experienced, when I saw her, the greatest difficulty in swallowing, and was tormented during the attempt with suffocative fits of spasm of the laryngeal muscles: the back part of the pharynx and fauces were very much swollen and congested, but there was no external evidence of any suppuration beyond an indistinct fulness on the left side of the neck, accompanied with tenderness on pressure. Leeches and fomentations were subsequently applied, and mercury also was given at the same time that nourishing broths were administered; but, after remaining some days in the hospital, suffering the greatest agony, she died from pure exhaustion. A post-mortem examination revealed the true cause of her distressing symptoms. A circumscribed post-pharyngeal abscess existed, which had pressed forwards to the back of the larynx and trachea.

The second case to which I alluded occurred about two months subsequently, also in a woman of previously delicate health. She had swallowed the bone only two days before, since which period gradually increasing difficulty of deglutition had supervened; but her symptoms on admission into the hospital were not so urgent as in the former case. No bone could be felt in the course of the tube with the hook. Leeches were applied to the outside of the neck, but no relief was obtained; on the contrary, the symptoms rapidly increased in severity. With the

unfortunate result of the last case in my mind, I was induced most carefully to examine the back part of the pharynx, and discovered a considerable fulness in that region. I did not hesitate to plunge into it a sheathed tonsil lancet, and a quantity of most fetid pus was evacuated. I need not say, that the relief was almost instantaneous. Gargles of chloride of lime were subsequently used; and, by the aid of nourishing diet and tonic medicines, she went on very well for a short time. In a few days, however, more unfavourable symptoms became developed, which were found to arise from the orifice of the abscess being closed, and a fresh accumulation of matter having collected behind. This was soon remedied by the introduction of a probe, which gave vent to almost as great a quantity of pus as was first evacuated by puncture. Nothing subsequently occurred to retard the favorable progress of the case, the orifice being daily kept patent by the introduction of caustic. I may remark, as one characteristic of suppuration occurring in this locality, that the pus confined in the abscesses had a most noisome sickly odour, more like that resulting from suppuration connected with necrosed bone than anything else I have ever experienced. I have successfully removed a common pin from near the cardiac orifice of the stomach by means of this blunt hook. A surgeon to whom I was showing the instrument, and describing its employment in the above cases, immediately procured one for his own private use, and, strange to say, he had only possessed it a week when he was called on suddenly to test its applicability in case of a boy who had attempted to swallow a counterfeit half-crown to avoid detection by the police, but which had become impacted in the œsophagus, and produced imminent danger of suffocation. The hook fulfilled its duty, and the ends of justice were thus aided.

Let me, therefore, in conclusion, strongly advise you against the indiscriminate use of the probang in cases of impacted foreign bodies in the œsophagus. An instance is now fresh in my memory where one of the most distinguished legislators of the day lost his life in consequence of the impaction of a bone in the gullet, and in which case a surgeon had made forcible use of the probang unsuccessfully. When soft substances, as a piece of meat, are lodged in this canal, then the probang is clearly indicated.—*Med. Gazette, April* 5, 1850, *p.* 607.

101.—ACCOUNT OF TWO CASES OF CANCRUM ORIS, SUCCESSFULLY TREATED.

By Dr. J. Drew, House-Surgeon to the Manchester Infirmary.

[Dr. Drew relates two cases of this intractable disease successfully treated by the same means, viz., the application of strong nitric acid, and the administration of chlorate of potash, with wine and meat diet. Dr. D. says:]

The first case is that of Anthony McDonnell, aged nine, admitted to the wards of this hospital on the 18th of last October. From the statements of the parents, he had been of robust health from infancy until about eighteen months ago, when he became the subject of some febrile

affection, but concerning the nature of which they could not particularly specify. Six weeks before the date of his admission, he was attacked with acute and continued pain in the left cheek, soon accompanied by a small dark discoloration, which had rapidly increased in size, notwithstanding the treatment of one or two medical men, until it had attained its present dimensions; the pinched physiognomy, and the usual attendant symptoms of this disease were now fully developed, and on examination the dark coloured slough was found to occupy the whole of the left side of the face, passing irregularly from a point just below the orbital surface of the superior maxillary bone, inwards and downwards along the side of the nose, implicating half of the upper lip, to about half an inch below the angle of the mouth, and backwards and downwards over the substance of the masseter muscle; the cartilages of the nose were intact; the immediate edges of the still living parts were deeply reddened, and to all appearances there was no tendency to the formation of a definitive line to its progression. McDonnell was at once put on the best meat diet, ordered daily fifteen grains of chlorate of potash in divided doses, and four ounces of sherry wine; to have the edges of the slough touched all round with strong nitric acid, and a linseed poultice repeated three times a day. Without entering into detail, the remainder of the treatment may be thus summarily stated; for four successive days the acid was freely reapplied, when rapid separation of the slough took place, and subsequently to its complete removal this potent agent was employed at two irregular intervals on a few suspicious points still remaining, so that altogether it was called into use on six different occasions. The fourth day of his admission he was attacked with diarrhœa, but it readily yielded to a compound of opium, catechu, and chalk mixture. On the cessation of this complication, the chlorate was increased to a scruple, and the wine to six ounces daily; under these enlarged doses he continued gradually but steadily to improve in appetite and to acquire strength, and was made an out-patient on the 3rd of December, or forty-sixth day of treatment. Some time before he left the hospital, it was very evident that a large portion of the superior maxilla would exfoliate, for the ulcerating line of separation was being formed, and bone loosened to an equal extent; and on the seventeenth day after going out they had progressed so favourably, that evulsion of the parts was performed by the aid of a strong pair of forceps, two out of the four processes of this bone (the alveolar and malar) coming away entire, with two of the milk teeth still firmly implanted in their sockets; since then the surrounding soft parts have been so busy in throwing out plastic organizable matter, and contracting, that at the time I now write the disfigurement is not nearly so great as might have been expected, nor the breach so extensive that it may not be remedied at some future period.

[The second case was much less severe, the slough, which extended through the cheek, having merely the superficies of a large wafer. The patient was a little delicate girl of six years old. The report is that,]

Precisely similar treatment was put in practice in this case, too: at first fifteen grains of the chlorate, afterwards increased to twenty grains

daily, and four ounces of wine, increased to six ounces, the best meat diet, and local applications of nitric acid; the latter was used on three successive days before the coming away of the slough, and was esteemed necessary only once afterwards. By the aid of these medicaments she rapidly improved in health, great contraction of the sides of the aperture took place, numerous healthy granulations were thrown out, and by subsequently uniting with others from the implicated portion of gum, this gap, though at first large enough to admit the middle finger, was completely closed, and she went out of the hospital, on the 10th of December, with a slightly sunken and puckered cheek, but in all other respects better than she had ever been before in her life.

On the fourteenth day of her admission I noticed that about three-quarters of an inch in front of, and somewhat above, the original solution of texture, a small, irregularly circular slough, three lines in diameter, had developed itself; and anticipating its tendency, gently tore away the surface, to ascertain the extent; already it had penetrated to a greater depth than the thickness of the cheek, but fortunately, on account of the very oblique direction, without yet implicating any portion of mucous membrane. Its progress was at once arrested by the strong acid, a clean surface was obtained in two days, kindly granulations were thrown out, and it soon healed, without ever opening into the cavity of the mouth.

The profession is indebted to Dr. Hunt for the introduction of chlorate of potash as a remedy for cancrum oris; but since he tendered his account of its virtues in 1843, many persons have thought proper to doubt its efficacy, and others have not hesitated to deny it altogether; still, though it may be quite true that the method of its action upon the organism is doubtful, it is only an accumulation of the evidence of experience that can establish or deny its merits as a medicament. When first made use of, it was thought to produce a beneficial influence by the diffusion of some of its contained oxygen; but as soon as it was objected that it might be detected unchanged in the urine of persons taking it, many thought this fact quite sufficient to upset the chemico-physiological theory of its action, without remembering that it had not been shown that the same amount of the salt might be collected from the urine as was administered by the mouth, and consequently not proved that a portion at least might not be acted upon and decomposed. As far, however, as the experience of five cases will enable me to judge, I should not think it advisable to trust to any constitutional treatment alone, any more than in the case of sloughing phagedæna in a different part of the body. It is essential that the portions of tissue which have taken on diseased action should be thoroughly destroyed; whether by the nitric acid, other potential agent, or the actual cautery itself, after the fashion recommended by Mr. Obré, appears to be quite immaterial; neither, on the other hand, should I like to trust to local treatment alone, for the gradual death of tissue is merely the consequence of a constitutional disease; and though layer after layer of texture might be destroyed, still the root of the evil would remain untouched. Both methods should be put in practice at the same time; and I am sanguine enough to think that the person who will put his trust in them will find that this dis-

case, by their combination, is as much under the influence of treatment as most other affections to which our bodies are liable.

In applying the nitric acid it is a matter of some importance to instruct the little patient to inspire fully previous to its application, that the lungs may be filled with air, and thus guarded in some degree against the difficulty or even danger that might result from the inhalation of nitrous fumes; and in the course of treatment it will be found of great advantage to separate carefully every slough as soon as formed, using, if necessary, even some little violence for the attainment of this object, on account of thus obviating to a considerable extent the great contamination of the air of inspiration.—*Lancet, Feb.* 16, 1850, *p.* 206.

102.—OPERATION FOR CLEFT PALATE.

By Samuel Smith, Esq., Surgeon to the Leeds General Infirmary.
(Reported by Mr. T. Scattergood.)

[The patient in this case was a young man of eighteen years old. The operation and subsequent progress of the case are thus narrated:]

Nov. 22nd, 1 p.m. —Mr. Smith operated. The first step in the operation was to divide the levator palati muscle on each side, as advised by Mr. Fergusson. This was done with great ease, for when the velum was touched, the muscle was thrown into strong action, and could be felt by the finger as a tense cord. The edges of the cleft were then pared, by transfixing each flap near the upper extremity of the cleft, and carrying the knife down to the apex of the uvula so as to separate a narrow strip of mucous membrane on each side; then removing both these portions, hitherto left connected together and to the velum, by dividing their common attachment. The patient was now sent away to wash his mouth out well with cold water, while another operation was being performed, Mr. Smith not wishing to attempt the union of the cut surfaces until the bleeding, which was not great, should have ceased. After a few minutes the patient returned, and all oozing having ceased, two sutures were introduced, one about a quarter of an inch from the apex of the uvula, and the other midway between the first and the upper extremity of the cleft. Small curved needles, threaded with a long silk ligature, were employed, and they were introduced by means of a pair of dressing forceps, having a small flat piece of cork, one-eighth of an inch thick, tied upon the inner roughened surface of each blade. The operator, standing in front, passed the needles from without to within on the left side, and from within to without on the right side. Holding in his left hand a slip of cane about five inches long, armed at its extremity with a small cork,—by gentle pressure with this instrument he prevented dragging of the flaps, while the needles were being introduced, and received upon the cork the point of each needle after it had passed through the soft parts. The sutures were then tied with the ordinary reef-knot, and the patient was sent to bed, with strict injunctions to take nothing to eat or drink until the next morning, and not to speak to any one except the house-surgeon or nurse. During the whole of the operation the patient behaved with

great firmness and self-control; but considerable embarrassment was caused by the occurrence of vomiting, which took place four times during the operation.

23rd.—The patient had strictly obeyed the directions which had been given him as to abstinence from food and from conversation. He was now allowed (about ten a.m.), to take a little boiled milk with arrow-root, and it was found that none of it passed into the nose. The apex of the right portion of the uvula was observed to be discoloured, as though likely to slough.

25th.—One of the sutures was removed on the 24th, and the other this day. The edges of the cleft were found to be united, as far down as nearly to the second suture; a portion of the apex of the uvula on the right side was sloughing.

Dec. 4th.—The case had proceeded quite favourably; the union of the upper three-fourths of the cleft was now quite firm, and at the lower part of the uvula there were two clean granulating surfaces. A suture was introduced in the same manner as previously, to keep these surfaces in apposition.

9th.—On removing the suture, the parts were found to be quite adherent.

14th.—There was no fissure remaining. The uvula was rather shortened and thickened at its apex, but its movements were quite perfect. Ever since the operation, the patient had been able to swallow liquids without any portion of them regurgitating, as they previously did, through the nose. His speech was somewhat improved, and the improvement was very apparent indeed when he was induced to make the attempt to speak distinctly. It was evident that the muscles required tutoring in order to articulation being rendered completely distinct.

The principal peculiarity in this operation was the employment of a pair of dressing forceps, to the inside of the blades of which (as above described) portions of cork had been fastened, for the purpose of holding the needles. This instrument was found to have a great advantage over the *porte-aiguille*, inasmuch as the latter can only hold the needle in one direction; whereas, by the armed forceps, the needle may be securely held at any angle, and pointed in any direction whatever. The cork attached to a handle, which was held in the left hand of the operator, by means of which he was enabled to make, as it were, counter-pressure, and to receive the points of the needles, was also found very useful; the cork held the point of one needle so firmly, that the latter was withdrawn, by its means, fairly out of the mouth.

The firmness of the patient, in steadily abstaining from any but liquid food (boiled milk and arrow-root) for many days after the operation, no doubt contributed greatly to its success.—*Medical Times, Jan.* 19, 1850, *p.* 37.

URINARY ORGANS.

103.—ON A NEW MODE OF TREATING CERTAIN CASES OF STRICTURE OF THE URETHRA.

By Prof. Syme, Edinburgh.

[The following is Mr. Syme's account of the first case in which he performed the operation which he now brings before the profession as being perfectly safe and successful.]

About six years ago, I was requested by the late Dr. Hay to take charge of a gentleman who had suffered long and severely from stricture of the urethra. He was between forty and fifty years of age, of tall stature and robust form. His complaint had existed twenty years, and during the earlier part of this period had been partially alleviated by the introduction of bougies, but had then gradually increased, until at length the suffering occasioned by it was altogether intolerable. During both day and night, the calls to make water were extremely frequent; and excited the most violent expulsive efforts, which, aided by a milking-like manipulation of the penis, and pressure along the perineum, never produced anything more than a scanty dribbling discharge. From the bladder being thus imperfectly emptied, the urine was constantly passing away insensibly, so as to keep the clothes wet, with what discomfort to the patient may be more easily imagined than described. He was peculiarly susceptible in regard to atmospheric changes, and especially in damp weather suffered an aggravation of the symptoms. The urine, when collected on such occasions, was found to deposit large quantities of glairy mucus, from which indeed it was never quite free.

On examination, I found a tight stricture between five and six inches from the orifice of the urethra; and, at the second or third attempt, succeeded in passing the smallest-sized bougie fairly through it into the bladder. I then supposed that, as usual, there would not be any further difficulty in treating the case, and desired the patient to call upon me twice a week, unless when the weather or any other circumstance should render a longer delay necessary. The progress, though not rapid, at length enabled me to pass No. 5 of my scale, equal to No. 1 of that in common use, when I found it impossible to make any advance. Indeed, there was little encouragement to persevere in attempting this, as, notwithstanding the degree of dilatation that had been accomplished, there was not any appearance of relief from the symptoms of the disease.

I then proposed to confine the patient to bed, and keep a succession of catheters, gradually increased in size, in the bladder. He made no objection, and was greatly pleased to find that, instead of the irritation he expected, there was at once obtained complete relief from all his previous uneasy feelings. He read and wrote, ate and slept, without the least disturbance, drawing off the urine from time to time, and observing

to his great satisfaction that the mucus had entirely disappeared. At the end of ten days I withdrew the full-sized silver catheter then employed, and before twenty-four hours had expired, found the complaint in every respect exactly as it had been before the process was commenced.

Some months after this, I divided the stricture from within by means of a catheter containing a lancet blade, which was protruded from its sheath after the instrument had been passed through the seat of contraction, and kept in this expanded state while the catheter was withdrawn. A large bougie was immediately afterwards passed with perfect ease; and again hopes of success were entertained. But next day things were in precisely the same state as formerly.

Several months having elapsed without any change, it was resolved to combine the two last mentioned modes of treatment. In the first place, I divided the stricture as before, but on both sides, by means of two lancet-catheters, cutting right and left, and then introduced a full-sized catheter into the bladder, where it was retained for a week. For some time afterwards, it seemed as if benefit had resulted from this procedure, and the patient, by frequently passing a bougie or catheter through the strictured part, was enabled to make water in a tolerably full stream. But this imperfect relief was of short duration, and by the end of two or three weeks, the frequent calls, laborious straining, and copious mucus, proclaimed that the stricture had regained its former condition.

The patient now protesting that life was not desirable under the torment of his complaint, and entreating me to employ some efficient measure of remedy, no matter at what expense of pain or risk of danger, I resolved to divide the stricture by free external incision. With this view, a small staff, grooved on its convex side, having been introduced, I made an incision in the raphè of the perineum from the bulb to the anus, and then feeling for the stricture, which was easily recognized by its surrounding induration, ran the knife fairly through the whole extent of the thickened texture. A full-sized catheter was substituted for the staff, and retained for a few days. The patient suffered little from the operation, except some uneasiness from irritation caused by the urine passing through the wound. When it closed he felt quite well; and he continues to do so, though several years have now elapsed. He has never required the bougie, and in every respect he enjoys the most perfect health.

In this case, the obstinacy of resistance, and tendency to contract, occurred in an extreme degree. Indeed, the latter peculiarity was so strongly marked, that it suggested the idea of an adventitious elastic texture, or rather one possessing contractile properties similar to those of the middle coat of the arteries. It is plain that the most prolonged use of bougies would not have effected a cure. And the result of retaining catheters in the urethra, shows that this mode of treatment is not so effectual as it has been represented, since it only produced a temporary dilatation. But the most important lesson is to be drawn from the results of the different trials that were made of internal incision by lancet-catheters. Additional space was thus at once obtained, and the passing of bougies was greatly facilitated, without any lasting

difference being effected in the contractile power of the stricture. It hence appears that this mode of treatment affords no practical advantage, since, in the ordinary condition of stricture, bougies accomplish recovery on the easiest possible terms; and in its obstinate form, an internal incision does not prove sufficient to relieve the patient. The reason of this I believe to be, that the obstinate stricture in question requires, for its complete and permanent remedy, a thorough division of the firm texture which surrounds the contracted part of the canal.

[The operation is performed in the following manner:—]

If the patient has a great dread of pain, and wishes to escape from the slight degree of it which attends the requisite incision, he should be placed under the influence of chloroform—not partially, so as merely to suspend his consciousness or impede his recollection of suffering—but completely, so as to prevent any restlessness or unruly struggle, which would tend very seriously to increase the difficulty of the procedure. He should then be brought to the edge of his bed, and have his limbs supported by two assistants, one of them standing on each side. A grooved director, slightly curved, and small enough to pass readily through the stricture, is next introduced, and confided to one of the assistants. The surgeon, sitting or kneeling on one knee, now makes an incision in the middle line of the perineum, or penis, wherever the stricture is seated. It should be about an inch or inch and half in length, and extend through the integuments, together with the subjacent textures exterior to the urethra. The operator then, taking the handle of the director in his left, and the knife, which should be a small straight bistoury, in his right hand, feels, with his forefinger guarding the blade, for the director, and pushes the point into the groove behind, or on the bladder side of the stricture,—runs the knife forwards, so as to divide the whole of the thickened texture at the contracted part of the canal, and withdraws the director. Finally, a No. 7 or 8 silver catheter is introduced into the bladder, and retained by a suitable arrangement of tapes, with a plug to prevent trouble from the discharge of urine.

The process having been thus completed—which it may be in less time than is required for reading its description—the patient has merely to remain quietly in bed for forty-eight hours, when the catheter should be withdrawn and all restraint removed. The urine sometimes maintains its proper course from the first, but more frequently passes in part through the wound for some hours, or it may be a few days. No attention or interference is required on this account, but at the end of eight or ten days a moderate-sized bougie should be passed, and repeated once a week or fortnight for two months. In most cases, the cure may then be deemed complete and lasting. But if the tendency to contraction should have been extreme, or if the patient's way of life should be such as to favour the reproduction of stricture, it will be a prudent precaution to have the bougie passed four or five times in the course of a year, in order to avoid all risk of future trouble.—*Brit. and For. Medico-Chirurg. Review, April*, 1850, *p.* 324.

[It must be remembered, as the reviewer of Mr. Syme's book in the journal from which our extracts are taken, observes, that the operation

here proposed differs widely from that in which an incision is made into the perineum, where *no* instrument can be passed into the bladder; but, as will be seen in another part of this article, Mr. Syme boldly asserts that no such case as impermeable stricture exists, and he challenges the London surgeons to send him any case in which they have failed to introduce an instrument, staking his reputation on his own success. This is a bold measure of Mr. Syme's, and we shall watch the result with great interest.

The following is the account of a case in which Mr. FERGUSSON recently performed the operation of division of stricture:]

The patient, a man between 36 and 40, has laboured from his childhood with difficulty in urinating. At the early age of 5 he was under the care of a medical man in consequence of this difficulty, and of his wetting himself when he walked about. About ten years since he had a gonorrhœa, since which the difficulty in making water has increased. About twelve months ago, his symptoms were much aggravated, and he suffered from an attack of retention of urine, and since this period his water has merely dribbled away from him. Catheters have been used from time to time, but none could be introduced into the bladder for a considerable period, although attempts have been made. On his admission to the hospital, Mr. Fergusson attempted to pass instruments, but it was impossible to get anything through the stricture, which was tough and irritable, situated in the bulb of the urethra in front of the triangular ligament; there were no fistulous openings in the perineum, but the urine was loaded with copious mucous deposits, showing a great amount of irritation of the bladder, which called for some decided relief. Mr. Fergusson therefore determined to lay the stricture freely open. Previous to this operation, however, a careful attempt was made with the catheter whilst the patient was under the influence of chloroform, but it was impossible to get through the stricture: the operation was then proceeded with in the following manner.

The patient being placed in the position for lithotomy, a sound, with a groove in the centre, was carried down to the face of the stricture, and held there by an assistant. An incision was then made in the centre of the perineum, and the knife was carried into the groove of the staff, and run forward until a portion of the stricture was divided. The staff was then carried still onwards, and the knife further used until the greater portion of the stricture was divided. A full-sized silver catheter was now introduced, and an attempt was made to pass it into the bladder, the knife being at the same time used to cut the remainder of the stricture; at this step of the proceeding there was great difficulty, and the silver instrument could not be carried into the bladder: this, therefore, was removed, and Mr. Fergusson carried a No. 8, gum-elastic catheter into the urethra, which, with some manipulation, very readily entered the bladder, and was retained there. There was very little hemorrhage in this case.

Mr. Fergusson stated that in these cases when difficulty was met with, as in the instance before them, it was owing to his not being able to hit the opening of the triangular ligament after having divided the strictured

portion in front. One thing very worthy of notice here was the facility with which he passed the gum-elastic catheter after the silver instrument had been tried in vain. He had experienced the same thing before in these operations. We have particularly noticed this before in the hands of this surgeon; and we a short time ago witnessed this circumstance in the hands of another able surgeon who performed the same operation. In this case there was so much resistance to the silver catheter that it was very nearly split in two; yet, on attempting a flexible instrument it went in, although no more of the urethra was divided.—*Med. Gazette, May 3, 1850, p. 775.*

[This patient appeared to go on well for some days, but symptoms of great prostration came on, and he died on the thirteenth day from the operation. The cause of death appeared to be mere exhaustion.

The following case was under the care of R. PARTRIDGE, Esq., Surgeon to King's College Hospital. It is thus related in the 'Lancet':]

Since Mr. Syme has so strongly advocated the division, through the perineum, of such strictures as will not yield to the ordinary means of dilatation, the practice has been imitated in various London hospitals, with results not quite so favourable as those referred to in Mr. Syme's book on the subject. Nor does it seem that the knife was resorted to in London when even a very small instrument could pass, and, so far as we are aware, no urethra had been incised, except it was quite impassable, though Mr. Syme advises an operation when the surgeon has to deal with intractable, though not quite impervious, strictures.

The cases which we have had an opportunity of reporting ('The Lancet,' Dec. 8, 1849, p. 617, and Feb. 16, 1850, p. 217,) were both successful. We have, however, now to mention one, lately under the care of Mr. Partridge, where the division of the stricture was not followed by such happy results; but it will be perceived by the sequel, that various circumstances, unconnected with the operation itself, had much influence on the issue of the case.

Case.—The patient, a man, thirty-seven years of age, and of temperate habits, was admitted, on the 24th of December, 1849, under the care of Mr. Partridge, with abscess in the perineum, which had appeared three days previously. He stated that he had twice been affected with syphilis, and once with gonorrhœa, followed by swelled testicle. Eight years ago he suffered from stricture, and was successfully treated by bougies, so that he could pass his urine in a full stream. Two months since, the stricture reappeared, with retention of urine, when he applied to a medical man, who, by passing a catheter, gave him much pain, but afforded him great relief. When admitted, he presented a deep-seated abscess in the perineum; it was hard and inflamed, and it pressed on the urethra in such a way as to impede the flow of urine through the canal, this fluid being voided guttatim. There was also an œdematous state of the scrotum, which was tender and painful. Pulse weak and slow, and pain complained of on micturition.

Fomentations and morphia at night gave him some relief. Seven days after admission, Mr. Partridge opened the abscess, and evacuated a

great amount of pus. This measure gave the patient much comfort, and he was soon able to void a small stream of urine without pain.

On the 6th of February, forty-two days after admission, the symptoms became again so alarming, that Mr. Partridge cut down upon the perineum, just behind the scrotum, and opened two or three irregular sinuses. Ten days after this, Mr. Partridge, having found it is impossible to pass an instrument into the bladder, resolved to lay open the urethra, and the patient was brought into the theatre on the 16th of Feb.

The Operation.—He was placed in the position for lithotomy, and, brought under the influence of chloroform, when Mr. Partridge introduced a small staff down to that point of the urethra which offered complete resistance to the passage of an instrument—viz., the bulb. The first incision ran exactly along the raphé, and was about two inches long. Mr. Partridge then cut very cautiously towards the deeper structures, and after some dissection reached the groove of the staff. When the knife was securely placed in the groove, it was made to divide the spongy portion of the urethra upwards and downwards, including the principal stricture just behind the bulb, to such an extent as was likely to allow an easy passage to a catheter. The latter measure was, however, accomplished with considerable difficulty, owing to the contorted and irregular course of the canal. The obstacles were finally overcome, an elastic catheter was passed into the bladder and retained there by appropriate means.

The patient went on pretty well until about four days after the operation, when the scrotum became œdematous, signs of erysipelas appeared, and he lost his rest and appetite. Great sickness soon came on, the œdema spread to the penis, the pulse became small and thready, the countenance anxious, and low delirium set in. The water passed, however, chiefly through the catheter, and very little through the wound. As the scrotum and penis threatened to slough, Mr. Partridge made several superficial incisions into these organs. This measure gave the patient some relief; but he soon had a considerable loss of integument on the lower part of the penis, gradually became weaker, and died ten days after the operation.

Mr. Partridge remarked, in a clinical lecture which he gave on the subject, that abscesses such as those which were opened in this case do not always communicate with the urethra, but that they may cause stricture by mere pressure on the canal. Such abscesses have been known to form, during gonorrhœa, along the urethra or by the side of the rectum. In this case, however, the patient suffered from a chronic abscess in the perineum; this peculiar kind is seldom found along the urethra. Thus, the incision which was made did not relieve the stricture, although a very little urine escaped through the former. This patient had had a similar perineal abscess several years before. In his present attack the urine continued to flow by the natural outlet of the size of No. 3 catheter; and when this is the case we are not justified in laying opening the urethra, provided there be no complications.

But in this case the stricture was complicated with fistulous tracks, and it was deemed prudent to lay these open, especially as the parts around were much thickened, and almost cartilaginous. Mr. Syme is

even an advocate for laying open the urethra in simple stricture, by an incision in the median line, where no such tracks exist as a complication, and without any abnormal induration of the tissues; Mr. Syme's is an old operation revived. In this case, as the catheter could still not be passed beyond the obstruction any better than before the incision was made, it was determined to lay open the seat of the stricture by a second operation. But in many long-standing cases, the urethra becomes impervious anterior to the stricture, and then we must lay open the whole canal, and allow a passage to form over a catheter retained in the track. Stricture of the urethra may occur at any part, even at the orifice, or throughout its entire extent, but the most usual seat is where the membranous portion joins the bulb. Spasmodic stricture results from the action of those fibres of the accelerator urine, which encircle the urethra in front of the membranous portion. The whole muscle, indeed, may act spasmodically in this way, and comprise the commencement of the spongy portion. The encircling fibres alluded to are not always present in every subject.

On a post-mortem examination being made, the posterior lining mucous membrane of the bladder was found congested and studded over with earthy deposits of salts of lime. There were also three or four bands in the prostatic portion of the urethra, and numerous false passages of old date. The stricture was very long, and the urethra anterior to it much contracted in calibre. Unfortunately this patient caught the infection of erysipelas, which commenced at the scrotum, and led to acute œdema, resembling in appearance the effects of infiltration of urine. Owing to this œdema, the cellular tissue both of the penis and scrotum, partially sloughed, and several superficial incisions were made to relieve the tension of the parts. Being a nervous, irritable man, he sank from the erysipelas, which did not, however, extend beyond the pubes and the lower part of the abdomen. As regards the original malady, it was a case well suited for Syme's operation, as the tissues were much indurated, and the stricture, of great extent, rendered the urethra tortuous as well as constricted.—*Lancet, April* 13, 1850, *p.* 452.

[In reply to the remark made at the commencement of the above case of Mr. Partridge, respecting the unfavourable results which have followed the operation for division of stricture, in the London Hospital, Mr. SYME observes:]

Now, such results were to me no less surprising than distressing, since, from all that had fallen within my own observation, the operation, in so far as it concerned the patient's life, seemed to be absolutely free from any danger whatever, and they constrained me to suppose that some error must have been committed in the mode of performance, as, through an imperfect division of the stricture, which would expose to the risk of urinary extravasation, or through opening the urethra at its side instead of the middle line, which would endanger the artery of the bulb. But from all these unpleasant speculations I was at once relieved by the further statement of your reporter, that in no case "was the knife resorted to in London when even a very small instrument could pass, and, so far as we are aware, *no urethra has been incised except it was quite*

impassable;" since it thus appears that the fatal cases which have been placed to the credit of my operation, and adduced at the meetings of your medical societies in London as evidence of its danger, were performed in accordance, not with the principle advocated by me, but with that of the old, or as, for the sake of distinction, it may be called the "London" operation, in regard to which I have thus expressed my opinion:—"The last, and certainly most objectionable of all the methods which have been mentioned above as in use for the treatment of stricture, is cutting into the perineum in search of the obstructed canal, without any further guide than the point of a catheter, introduced, not through, but merely down to, the accustomed part." Sir B. Brodie says, very truly,—"Even under the most favourable circumstances, it cannot be otherwise than doubtful whether the stricture be properly divided—that is, whether the incision has passed through the narrow canal in the centre, or through the solid substance on each side. I suppose that no surgeon would recommend such an operation, except as a last resort, when no instrument could be made to pass through the stricture by other means." It might be added, that, in addition to the danger thus incurred, of establishing an imperfect canal, constantly disposed to contract, and inconvenient from its tortuous direction, there is also the immediate hazard of failure in accomplishing the introduction of a catheter into the bladder, which would expose the patient to nearly certain death from extravasation of urine.

No two operations can be more different in the principles upon which they are founded—the security of their execution—and the result of their performance, than the one thus so justly reprobated, and that which, it has been my endeavour to recommend. The ground of the former is belief in the impermeability of the stricture, while the latter essentially requires the passage of an instrument through it. The former is protracted, uncertain, dangerous, and unsatisfactory; while the latter is done at once, perfectly safe, and completely effectual. It must have been from confounding two procedures so entirely different, or more probably from acquaintance with only one of them, that an hospital surgeon in London, when consulted as to the expediency of submitting to my treatment, coupled his sanction with advice, that the patient should, in the first place, make his will.

The operation by external incision hitherto employed has been resorted to as the refuge of awkwardness, or failure in the introduction of instruments, there being no truly impermeable stricture; while the one now advocated can be accomplished only by steps requiring the nicest manipulation. Passing rigid instruments through a tight stricture was said, by Mr. Liston, to be the "most difficult in the whole range of surgical operations;" cutting into the groove even of a large staff is considered by many the most embarrassing part of lithotomy; and conveying a catheter into the bladder through a urethra having a slit in its side, would perplex an operator not well acquainted with the course of the canal. Such being the nature of the operation, it should hardly be undertaken by any one who is not able to overcome the ordinary difficulties which are presented in the surgical treatment of the urethra.—*Lancet, April* 20, 1850, *p.* 487.

[In a paper read by HENRY SMITH, Esq., before the Westminster Medical Society, he said that,]

The operation of dividing the urethra from the perineum was only generally considered necessary when no instrument could be passed through the stricture; but latterly it had been recommended by Professor Syme, of Edinburgh, that a free division of a stricture should be made, even in instances where an instrument could be passed. If the operation of cutting into the urethra were free from danger, this would doubtless be the readiest and most effectual method of treating those obstinate forms of stricture which Professor Syme had alluded to; but when they came to recollect that such an operation was likely to be attended with fatal results, they must pause before they followed such a doctrine. He (Mr. Smith) thought that the surgeon was not justified in cutting so freely into the urethral canal in such cases, and, he thought, should look for some milder means than the use of the knife. He was fully borne out in this opinion by the result of a case where the operation had been done, and a fatal termination had taken place. He would mention the case: it was that of a fine young man who had suffered for several years from a stricture of the urethra, which was very obstinate and irritable, resisting the ordinary methods. The patient happened to be under the care of his surgeon, a very skilful man, soon after Professor Syme's work came out. The operation of dividing the stricture was resorted to, a small grooved staff being first passed through the stricture. The operation was well done; the patient had some bleeding the night after. He went on pretty well for some days, when bad symptoms set in, which rapidly took a low form, and he sunk within a fortnight after the operation, with all the signs of irritative fever. On post-mortem examination, no extravasation of urine, nor any inflammation within the pelvis, was found, and the bladder was perfectly healthy. This case spoke forcibly against division of a stricture, except when it was absolutely necessary, and he deemed it was only so when no instrument could be passed. The question, then, was, what means had the surgeon at his disposal to remedy those cases of stricture which Professor Syme had described as being so undilatable and so obstinate that they cannot be cured by the catheter alone. He considered they had a valuable remedy in the potassa fusa, which, although a troublesome and perhaps dangerous agent if carelessly used, when employed with proper precaution, was of much service, and, in his firm conviction, would often lay aside the necessity of the knife. Caustic had been much abused by some surgeons, and therefore it had fallen into discredit; but this was no argument against the remedy. He was surprised to see that Professor Syme, in his work on "Stricture," had denied the benefit of caustic, and had stated his belief that it could not remove an organic stricture. But without referring to the numerous cases which had been treated by a fellow of the Society, (Mr. Wade), and which had been published by him, he (Mr. Smith) could convict Professor Syme of an error, by relating the following case:—A gentleman, aged forty, applied to him in the end of November last. He was one of the last patients of the late lamented Mr. Morton, under whose care he had been for some months. He had suffered many years from stricture. Mr. Morton had passed an instrument once into the

bladder, but of late had not been able to get anything through the stricture; and when Mr. Smith saw him he was suffering much; he had had some attacks of retention of urine, and his water occasionally came away only in drops, and he was in great mental distress. He had very cautiously several times attempted to introduce a catheter, but nothing would go in; and he told the patient that he must either be cut, or must have caustic applied. The latter plan was agreed upon. The potassa fusa was applied by means of a wax bougie. The stricture, which was long and tough, gradually gave way; and on the seventh application he passed a No. 6 catheter into the bladder, and he can now pass with ease the largest instrument in his case. This case showed the efficacy of caustic, but he would not resort to it unless it were actually necessary; yet he thought that it should be applied to those cases of stricture which would not dilate by the bougie, and where Professor Syme recommended cutting. He felt it was the duty of the surgeon to use it, and he believed that the knife might be to a great extent dispensed with if the potassa fusa were carefully employed.—*Lancet, Feb.* 23, 1850, *p.* 248.

[Mr. Syme, however, boldly advances the opinion that there is no such thing as an *impermeable stricture.* Were not the authority so eminent, we should be led to doubt such a statement. The following observations have been elicited from him by certain remarks made by some of the London surgeons on his paper on stricture, and on his mode of curing it. He says:]

This operation is founded on the fact, as I believe it to be, that there is no stricture of the urethra which can resist the introduction of instruments sufficiently small, and guided with sufficient care. I have distinctly stated this persuasion, and am prepared to maintain it without any qualification whatever.

Any stricture which resists the attempt of a surgeon to pass an instrument through it, though impermeable as far as he is concerned, may not necessarily be so in the hands of others. During my incumbency at University College Hospital, there was admitted under my care a stricture of the urethra which had proved impermeable to the diversified efforts of many gentlemen in the naval service for nine years, and finally led to the patient's dismissal as incurable. But at the very first attempt in this case I passed a bougie into the bladder, and in the course of a few weeks removed all trace of the contraction. Five months ago, a gentleman from Ireland came over in quest of relief for a stricture, on account of which, two years before, he had been six weeks under the care of Mr. Liston, who, notwithstanding many attempts, did not succeed in passing any instrument; and although the symptoms denoted a great aggravation of the disease during the time which had subsequently elapsed, I passed a grooved director, divided the stricture, and was happy to learn, from a letter received to-day, that the patient "is as well as ever he was in his life." In the Royal Infirmary of this city, there is at present under my care a young man who, six years ago, was dismissed from the army of the East India Company, after five years' service, as incurable, on account of stricture. He had been under the care of various practitioners without obtaining relief, and for the last sixteen months had once

a week passed a steel bougie fairly into the bladder, as he thought. Finding the symptoms indicative of something more than mere obstruction, and suspecting that there was a false passage through the prostate, I carefully examined the canal, and succeeded in passing a small instrument into the real cavity of the bladder, where a stone was detected. Chloroform having been administered, I performed the requisite operation upon the small director, which had been introduced, and extracted a stone weighing *three ounces and a half*. The patient had no unpleasant symptom, and has now the prospect of being quite well in a few days. In many more cases which I could mention, the stricture was deemed impermeable without truly being so; and perhaps those lately reported in 'The Lancet' as thus regarded might have proved no less amenable to treatment. I firmly believe that they would, and therefore feel most anxious to impress the conviction that the alleged impermeability has no real existence.

Since the public profession of this belief, founded upon more than twenty years' hospital practice in the largest medical school of Her Majesty's dominions, seems to have had no effect in awakening the attention of London surgery, further than to elicit some incredulous sneers and flat denials, I beg to express my readiness to receive into the Royal Infirmary of Edinburgh any patients who may bring with them certificates, from a London hospital, of labouring under *impermeable* stricture. I shall be happy to pay their expenses in coming and returning by the steamboats, which sail twice a week, and would afford the most comfortable conveyance for invalids frequently disturbed with calls to make water. They will be treated under the observation of students from all parts of the country, and the result of their cases shall be published. If any more satisfactory mode of establishing the truth can be suggested, I shall be happy to adopt it.—*Lancet, May* 18, 1850, *p.* 605.

104.—*On the Treatment of Stricture of the Urethra by Caustic.* By Robert Wade, Esq., Senior Surgeon to the Westminster General Dispensary.—The potassa fusa appears to me to act beneficially upon strictures:—Firstly, by its dissolvent powers; Secondly, by promoting absorption, and stimulating the congested vessels to contraction; Thirdly, by relieving irritability and inflammation.

Method of applying the potassa fusa. Before using the potash, a bougie should be passed down to the stricture, that its distance from the orifice of the urethra may be correctly ascertained. A small piece of potassa fusa should be inserted into a hole made in the point of a soft bougie. The eighth part of a grain is the smallest, and a grain the largest quantity of the potash I am in the habit of using; but it will rarely be necessary to exceed the sixth of a grain. It will be well to make two notches in the bougie containing the potash; one, marking the exact distance of the stricture; the other, an inch beyond; as, very probably, on introducing the armed bougie, the first mark may be concealed within the urethra, from the penis being more stretched than when the measurement was taken. The bougie must be well moulded round the

potassa fusa, so as to prevent the alkali from projecting; and it should be so placed, that it may be more applied to the upper than the lower part of the stricture, for obvious reasons. Armed bougies should be well rounded at their points, to guard the urethra from the action of the potash before it reaches the stricture. In very bad cases it may be advisable occasionally to use the potassa fusa in the recumbent position, as it will then not only be best applied to the surface of the stricture, but be most likely to penetrate its texture, which, in old and hard obstructions, is very desirable. The bougie should, of course, be well oiled previous to its introduction.

To impervious strictures, from three to four are the sizes of the bougies I generally employ when using the potassa fusa; and, to such as are pervious, they should be used of a size or two larger than the obstruction, which the point of the instrument should penetrate. The armed bougie must be rapidly passed down to the stricture, and held against it, with gentle but steadily continued pressure, for one, two, or three minutes, according to the nature of the obstruction, which if very irritable and readily bleeding, the shortest time, or even less, should be at first selected as the most prudent course.

The periods at which it will be most advisable to repeat the application of the potassa fusa must depend upon its effects and the nature of the cases in which it is used. In many old chronic strictures, I have used the potash advantageously every second or third day: but, in others attended with more irritability, it will be better to allow four days to intervene before its application be repeated. There is, however, one safe rule for our guidance upon this point, which is, never to reapply the potassa fusa until the complete cessation of all irritation produced by its previous application. The potassa fusa should be kept in a phial with a ground-glass stopper. If good, it is extremely hard, and of a blue or dirty white colour. It should not be broken until required for immediate use.

Cases in which the potassa fusa may be used with advantage. Firstly, hard, fibro-cartilaginous strictures, impervious to instruments without the employment of injurious pressure; Secondly, hard strictures of long standing, which, although admitting the passage of a small bougie, bleed freely on its introduction: Thirdly, irritable strictures; Fourthly, spasmodic strictures, not arising from acute inflammation of the urethra; Fifthly, strictures which have a marked disposition to contraction.—*Brit. and For. Medico-Chirurg. Review, April* 1850, *p.*328.

105.—*Case of Lithotomy in which a Modification of the Bilateral Operation was Practised.* By Wm. Fergusson, Esq.—[In this case the child was two years and a half old. The operation is thus described:]

Chloroform was administered in the ward, and the boy brought into the theatre in a perfect state of anæsthesia—a mode of proceeding much to be commended, as time and a certain shock to the child in being brought into a crowded theatre are thereby saved. The patient being held in the usual position by assistants, Mr. Fergusson requested the pupils to

maintain a deep silence, in order that the percussion of the stone, which was very small, might be distinctly heard. After this preliminary step, a staff of an appropriate size was introduced, and the instrument being held in the usual vertical direction by an assistant, Mr. Fergusson made a longitudininal incision along the raphé to within three-quarters of an inch of the anus, and from the lowermost point of this cut, another was made obliquely, outward and downward, towards the patient's left ischium, and a similar third one towards the right ischium, thus . The transverse muscle, levator ani, and deep fascia were then cautiously divided with a straight narrow-bladed knife, until the membranous portion of the urethra was reached. A double-edged beaked knife was now fixed in the groove of the staff, cautiously pushed forwards, made to divide both lobes of the prostate gland, and lay open the neck of the bladder. Mr. Fergusson then used a probe-pointed bistoury, with which he notched both sides of the gland, and the forceps having been gently introduced, guided by the index-finger of the left hand, a calculus of the size of a small hazel-nut, very smooth, greyish, and afterwards found to be of the lithic-acid kind, was readily extracted. The child lost very little blood, and Mr. Fergusson proceeded so cautiously, that the operation seemed to extend over a longer space of time than is usually the case. The reasons for this Mr. Fergusson now gave in a few observations which he made after the child was removed. It was at one time generally stated that lithotomy is an easy operation with children, and he (Mr. Fergusson) had himself been under that impression in his earlier days; but he had now found that these operations required a very great amount of care and caution. If much force is used, there is great risk of pushing both the prostate gland and bladder into the pelvis, and that viscus in such a case is not reached at all. In this instance he had been very careful not to fall into such a mistake, and had therefore proceeded very cautiously, using hardly any force, and carefully recognizing the parts with his finger. A dashing mode of operating is misplaced in such cases, and accidents of a very melancholy nature might be the result of it. It has happened that the surgeon imagined he had cut into the bladder when he was really in front of the neck of that organ, instead of having reached the cavity of the bladder; he had, in fact, pushed the parts before him. When the stone is so very small, there is so very little resistance, that the surgeon finds difficulty in making his incisions; with a large stone there is less hesitation. He (Mr. Fergusson) would advise his hearers always to proceed cautiously, and not to be afraid of taking ten or fifteen minutes for the operation; the more so, as chloroform will effectually keep off any feeling of pain. When the finger reaches to the depth of one inch, or three quarters only, there is a fair presumption that it is within the bladder, but if it goes to a greater distance within, it should be suspected that the parts have been pushed before the finger. The child has progressed very well: in eleven days the urine almost ceased to pass through the wound, and, in seventeen days after the operation, the child was discharged cured.—*Lancet, March* 30, 1850, *p.* 392.

106.—ON HYDROCELE AND SPERMATOCELE.

By Prof. Syme, Edinburgh.

[In a clinical lecture upon a case of hydrocele which had been operated upon,]

Mr. Syme stated, that he had long ceased to employ port-wine for injection into the tunica vaginalis, on account of its effect proving very uncertain; and that having subsequently used a mixture of the tincture of iodine with three parts of water for this purpose, he had, during the last five years, always injected the tincture alone, and without a single case of failure or unpleasant effect, either in public or private practice. The quantity required was about a teaspoonful, or as much as filled a common sixpenny pewter syringe, which was the most convenient instrument for the operation, as the substance composing it allowed the nozzle to be readily adapted to the canula of the trocar. The fluid when injected was allowed to remain, and while producing the effect desired with absolute certainty, seemed to occasion less pain than any other agent in past or present use.

When the tumour was punctured, the fluid which issued through the tube, to the amount of a pint or more, appeared somewhat turbid, and this was attributed to its probably containing the scales of cholesterine, which are frequently met with in albuminous fluid long pent-up in close cavities. The tincture of iodine, therefore, was injected as usual. But when a little of the fluid was poured from the bason, in which it had been received, into a glass vessel, in order that the gentlemen present might more readily examine it, the absence of scales, and the peculiar opalescence observed, at once suggested the idea of spermatocele, and an appeal to the microscope confirmed this suspicion, by bringing myriads of spermatozoa into view.

Had the true nature of the case being ascertained in the first instance, injection would not have appeared expedient, since spermatocele has not only resisted the means of treatment which have proved sufficient for the remedy of hydrocele, but has also shown a disposition to resent with violence even liberties of a much slighter kind. In illustration of this, there was mentioned a case in which the loss of a valuable life had been nearly sustained, from puncture alone without injection. The patient, a distinguished military officer, had twice had the fluid simply drawn off, in London, by Mr. Liston; on the first occasion with so little inconvenience, that, upon the second, he ventured to proceed immediately by railway to Scotland, where he became very ill, and was attended by Mr. Syme for inflammation of the parts concerned, with sloughing of the scrotum, from which his recovery, though ultimately completed, was long doubtful. It was, indeed, the obstinacy of the disease, when subjected to the treatment of hydrocele, which had led Mr. Liston to microscopical research for an explanation of the reason that "cysts which have contained fluids of this kind do not undergo the same process when inflammation is excited in them as serous cysts do; or, in other words, that a cure of such hydrocele, by injection, is not to be looked for;" and the established practice seemed to be limited within the use of palliative measures.

The result of this case was, therefore, watched with interest; and when, after passing through the usual course of a simple hydrocele, under the same circumstances, the swelling quickly subsided, with complete restoration of the testicle to its healthy state, it naturally suggested another trial of the same kind. For this an occasion happened at the time to present itself, in the case of a gentleman, who had had a hydrocele tapped about twenty years ago, by Sir Astley Cooper, and afterwards injected with port-wine by another surgeon in London, but still suffered from it. The tumour was in every respect very similar to that just mentioned; and when punctured, was found to contain the same sort of turbid opalescent fluid. The suspicion of spermatocele was confirmed by the microscope, which detected abundance of spermatozoa; but everything went on satisfactorily after the iodine was injected, so that before the end of three weeks the testicle had very nearly regained its proper size and consistence.

The two cases just related afford encouragement to attempt the radical cure of spermatocele by the injection of tincture of iodine, although other means have been found to fail; and in further testimony, as to the efficacy of this agent in the remedy of hydrocele, the following case, related by the gentleman who was the subject of it—treated at his desire in the hospital—may be added. He is about twenty-five years of age, and was admitted on the 18th of November.

"When a boy, about ten years of age, I got one of my testicles bruised on horseback, which caused hydrocele. Before I thought of consulting a surgeon nearly ten years had elapsed, by which time it had attained the size of a goose's egg. I applied first to the late Dr. Hannay of Glasgow, who punctured it with the intention of injecting port-wine, but finding the testicle somewhat enlarged, he desisted, saying, that to employ the radical cure in my case would be attended with danger. The following day the hydrocele was as large as ever, upon seeing which, he ordered me to keep my bed for a fortnight, hoping that there might be a spontaneous cure; but in this we were disappointed.

"In the spring of 1847 I was in Berlin, where, hearing of the many cures performed by Dr. Dieffenbach, I consulted him. In curing hydrocele he almost invariably performed the operation of incision, which he applied in my case. He performed the *operation* merely, the stuffing of the wound in the tunica vaginalis and bandaging being done by an assistant. In eight days there was a high degree of inflammation, attended by suppuration, and large quantities of matter were discharged; the stuffing, which was slackened by the suppuration, was now daily extracted, the wound was cleared of it in about a fortnight after the operation, and the swelling by this time was considerably reduced. There was fresh stuffing put into the wound daily, which was continued until it had nearly closed; this took place about five weeks after the operation.

"It may not be out of place to state, that there was much attendant suffering, tension of the bladder, gastric fever, and last of all, an abscess formed upon the groin, which had to be opened. I was thus kept almost bedfast for two months. Dieffenbach at last examined me, about nine weeks after the operation, with the result of which he

seemed satisfied, and prescribed a lotion for a hardness which existed. At this time the swelling was still about the size of a hen's egg.

"Upwards of a year after, I had an opportunity of speaking to Dr. Angelstein, who was appointed to Dieffenbach's situation in the hospital (pro tempore). He was the first to convince me that I was not cured, and was most anxious that I should allow him to try the injection of port-wine; but as I had heard Dieffenbach declaiming against this 'English method,' I determined not to submit.

"I next came in contact with Dr. Bühring, and mentioned to him the circumstance of his uncle's operation having proved ineffectual. He now made an attempt to cure me by means of electricity. He first stuck two rows of needles on the surface of the scrotum, opposite the testicle, about an inch apart, then, after tapping, he introduced a lancet and scarified the tunica vaginalis; the electro-magnetic apparatus was now set in motion, and the fluid kept streaming along the needles for some time, which caused a burning pain within. In two days there was apparently a sufficient degree of inflammation excited, and every reason to think that there would be a permanent cure; but I was again doomed to disappointment. Dr. Bühring new advised me to submit to the operation of excision, to which I would probably have consented, had I not about this time received a letter from a young surgeon, who had just finished his studies at Edinburgh; he urged me strongly to delay any further operation, relating the success which attended Prof. Syme's operations, and advising me on my return to Scotland to put myself into his hands. I did so, and have now the greatest pleasure in stating, that, by an almost painless operation, and after three weeks' partial confinement, I am completely cured."—*Monthly Journal, Jan.* 1850, *p.* 63.

107.—*Case of Hydrocele in which the Iodine Injection Failed in Effecting a Radical Cure.* By Dr. R. L. MACDONNELL, Physician to the Montreal General Hospital.—[In this case the hydrocele was very large, and presented this peculiarity, that the testicle was situated at the very lowest point of the tumour. Forty ounces of fluid were drawn off, and an injection composed of two parts of tincture of iodine and three of water, was introduced; but this not being followed by obliteration of the sac, at the end of three weeks the fluid was again drawn off, and the following method adopted, as recommended by Mr. Adams of the London Hospital.]

A camel-hair brush, dipped in undiluted tincture of iodine, was passed through the canula, and freely applied to all parts of the serous membrane within its reach. The next day, the tunica vaginalis was partially filled with a solid mass of lymph about the size of a large orange. This gradually became absorbed, and in less than three weeks he was discharged perfectly cured.

He again consulted me in June, 1848, for benign polypi of both anterior nares, which had displaced the bones and cartilages of the nose, and had given rise to great deformity and difficulty of breathing. I took advantage of the opportunity to examine the seat of the hydrocele, and

found the parts in precisely the same state as when he left the hospital. And again to day, Feb. 22nd, 1849, I examined the parts, and they are found in a perfectly healthy condition.

The foregoing case is not devoid of interest to the practical surgeon, on the following grounds:—

1. The situation of the testicle is quite unusual. Authors have varied in their statements as to the position which this gland occupies in hydrocele; according to some, it is more frequently met at the posterior part, a little above the centre of the tumour; others again assert that it is usually found *below* the centre; and some have stated that we find it occasionally in front of the tumour; but, as far as I am aware, no one has described its occasional appearance *at the very lowest part of the tumour;* on the contrary, the best practical writers agree in considering this situation of the testicle as a most valuable diagnostic sign between hydrocele and hernia; and it is not unlikely that a careless or superficial examination of the above case would have led to this error; its history, and the appearance of the tumour, being more calculated to mislead the surgeon than elucidate the nature of the disease.

2. The failure of the tincture of iodine injection is extremely unusual. In a note to 'Chelius' Surgery,' by South, it is stated that out of "eleven hundred and forty-eight cases treated by iodine injection, only *three* cases failed." In instances like the above I would strongly recommend the iodine to be used in the same manner as employed by me; for it does not give more pain than the injection, and is not so likely to excite excessive inflammation as the introduction of a quantity of pure tincture of iodine, a method of treatment advocated by some surgeons, and it is certainly a much less painful plan than that recommended by Professor Porter, whose operations I have had opportunities of witnessing.

3. A short time ago, the late Mr. Liston showed that the fluid of hydrocele frequently contained spermatozoa, and he drew from this circumstance the conclusion, that in such cases a radical cure by obliteration of the sac is not to be expected; for, instead of the latter being composed of the tunica vaginalis (a serous membrane), it is formed of the mucous lining of one of the seminal ducts,—a dilatation of which has taken place, in a manner similar to that observed in the formation of the tumour of ranula. When this discovery was first announced, a good deal of importance was attached to it by the illustrious author himself, and by writers on systematic surgery; yet in the case under consideration a most complete refutation of these views was furnished; for though the fluid contained an immense quantity of spermatozoa, as proved by careful microscopic examination, the cure was accomplished by adhesive inflammation of the walls of the sac: the result of treatment was also strongly opposed to an opinion recently advocated, viz., that it is not by the effusion of lymph, and adhesion of the walls of the sac, that the cure of hydrocele is effected, but by a restoration of the functions of the absorbents of the part. That a cure is frequently accomplished without obliteration of the sac, is no doubt true; but, on the other hand, it is equally certain that it is by adhesion that the radical cure takes place in a great number of cases, for we know that it is by producing this condition that the success of various plans of treatment of hydrocele is established.

[After referring to observations on the presence of spermatozoa in the fluid of hydrocele, and hypotheses to account for such facts, by Messrs. Liston, Paget, Lloyd, and Dalrymple, Dr. Macdonnell says,]

It seems to me to be more consistent with the facts of the different cases that have been placed on record, and with the particulars of that just detailed, to suppose that in the first instance the disease is merely a simple dilatation of one of the ducts, the result of contraction or obliteration of its canals from local inflammation, caused by some injury to the part; that after some time this dilatation gives way, and pours its contents into the cavity of the tunica vaginalis—in which they accumulate in some instances without interfering with the functions of the membrane, but in other instances the serous membrane takes on diseased action, and its secretion becomes mixed with that originally poured out from, and still secreted by, the ruptured cyst. In this way we can understand how the fluid may, in one case, present a limpid appearance, devoid of albumen; and in the other exhibit a copious admixture of albumen, and a variety of colours; and in both, we may find, on microscopic examination, a quantity more or less abundant of spermatozoa, in some cases alive, in others, dead and partially disorganized.

The practical deduction to be drawn from the above case, however, is, that the detection of spermatozoa should not deter us from attempting the radical cure, which, if we should not accomplish by one method, we may succeed in effecting by another.—*Med. Gazette, Dec.* 21, 1849, *p.* 1049.

108.—*On the Treatment of Certain Cases of Hydrocele by Seton.* By JOHN ERICHSEN, Esq., Assistant Surgeon to University College Hospital.—[There are certain cases of hydrocele, Mr. Erichsen observes, in which the iodine injection fails to effect a cure. This failure is attributable to two causes; either a sufficient amount of inflammation is not set up, to restore the balance between the absorbing and secreting powers of the tunica vaginalis; or, a good deal of inflammation is excited, but the fluid effused into the tunica vaginalis in consequence of this inflammation, does not become absorbed, or only to a small extent, and the sac still remains distended. Mr. Erichsen says:]

The proportion of cases in which the iodine injection fails to bring about a radical cure of the hydrocele, is variously estimated by different surgeons. Thus Mr. Martin states that in India the failures amount to scarcely one per cent. Velpeau calculates them at three per cent. I am not aware that any statistics of this mode of treatment in this country have been collected; but the general opinion of surgeons would appear to be decidedly in its favour, as being the most successful as well as the safest plan of treatment that has yet been introduced. In this opinion I fully coincide; but yet I think it by no means improbable that the success of the iodine injection in this country might not prove to be quite so great as is generally believed. I have during the last few years seen a considerable number of cases of simple hydrocele of the tunica vaginalis, both in hospital and in private practice, in which a radical cure had not been effected, although the iodine injection had been had recourse to by some of the most careful and skilful surgeons of the day;

and several cases which I shall presently relate, have occurred in my own practice.

It is always a source of much annoyance to the surgeon to fail in effecting a radical cure of a hydrocele. The disease occasions much inconvenience to the patient, who has been assured that injection will lead to a radical cure, and who may consequently attribute to want of skill or of care on the part of his attendant, a result that may rather be due to some individual peculiarity. In cases of this description I have found that the patient is seldom disposed to submit to a repetition of this or of any other kind of injection, and the plan that I have consequently adopted, and have generally found to succeed perfectly well, has been the old method of treatment by means of the seton.

There can be no doubt that, as a first remedy, the iodine injection is preferable to the seton in the treatment of hydrocele; but when the injection has failed, and this from no want of care on the part of the surgeon, or of attention to the after-treatment of the case, but apparently from insufficient inflammatory action having being set up in the tunica vaginalis to restore the lost balance between secretion and absorption in this membrane, the seton will, I think, be found to be the most certain means of accomplishing our object. It is true that several objections may be urged to the use of the seton; it requires much watching and care, and is occasionally apt to excite a dangerous amount of inflammation in the cellular tissue of the scrotum; and these objections are to my mind sufficiently valid to prevent our employing it as the ordinary treatment for the radical cure of hydrocele. But it must be remembered, that the particular cases to which I am now alluding are those in which ordinary means have proved insufficient to excite proper action, and in which, consequently, it would appear as if a greater amount of irritation could safely be borne. Indeed, nothing is more remarkable than the difference in the intensity of the inflammation that is set up in different individuals, by the means that are commonly employed in the treatment of hydrocele. In some cases the most irritating injections may be thrown into the tunica vaginalis; or a seton may be drawn through the scrotum, and left there for days, not only without giving rise to any injurious inflammation, but without setting up sufficient action to bring about a cure of the disease; whilst, in other instances, simple tapping may effect a radical cure, or may give rise to such an amount of irritation as to terminate in fatal sloughing of the scrotum. An instance of each of these effects of simple tapping without injection has occurred to me. About two years ago, a gentleman from Cuba consulted me for a small hydrocele, which had been forming for five or six months; I tapped it with a fine trocar, and drew off about five ounces of fluid: a radical cure resulted. This case bears out a remark made by Sir Benjamin Brodie, that the few instances in which he had known simple tapping produce a radical cure, occurred in West Indians. Last winter, I tapped an old man for a large encysted hydrocele, which contained about three quarters of a pint of fluid; inflammatory œdema of the scrotum came on, which proved fatal in about ten days.

The seton that I employ is composed of one or two threads of dentist's silk. It may be introduced by means of a nævus needle, the fluid of the hydrocele being allowed to drain away through the punctures thus

made; or, as recommended by Mr. Green, to tap the hydrocele, and then passing a needle, about six inches long, armed with the seton, up the canula, to draw it through the upper part of the scrotum, and then removing the canula, and cutting off the needle, to knot the thread loosely. The thread should not be removed until the scrotum swells and becomes red, with some tenderness of the testis, and effusion into the tunica vaginalis. When these effects have been produced, it may be cut and withdrawn, and the case treated in the same way as when the radical cure has been attempted by iodine injection—viz., by rest and antiphlogistic treatment. The length of time that it is necessary for the seton to be left in before sufficient, or even any, inflammatory action is produced, varies very considerably. In most instances, the proper amount of inflammation is excited in from twenty-four to thirty hours, but in other cases it may be left in for ten or twelve days, and gives rise to but little inflammation, although a radical cure may result.—*Lancet, March* 9, 1850, *p.* 292.

109.—*On the Radical Cure of Hydrocele.* By —— Lloyd, Esq.—The following is the substance of some interesting clinical remarks lately made by Mr. Lloyd at St. Bartholomew's Hospital, and reported in the 'Medical Times' for January 5th.

1. *Forcible injection of the sac of the tunica vaginalis.* He employed this plan some years ago in several cases among the out-patients of the hospital; at first he thought with success, but, with the exception of one case, the disease recurred in all; and what was the permanent result in that one, he had no opportunity of ascertaining.

2. *Acupuncture.* He had also given acupuncture a fair trial, but found it a very uncertain remedy; but oftener successful in children than in adults.

3. *Introduction of powder of hydrargyri nitr. oxidum into the sac.* This is the plan of treatment most relied on by Mr. Lloyd, and he has adopted it almost exclusively at the hospital for several years. It consists of the introduction into the sac, after it has been emptied of its contents, through the canula, of the substance finely levigated. This plan has been employed in a large number of cases, and hitherto without a failure, as well as without any untoward consequence whatever. It excites the necessary degree of inflammation, with as great, if not greater, certainty than the injection of wine, of solutions of sulphate of zinc, iodine, etc. It is, moreover, a much more convenient mode of treatment, as well as a saving of much time. The mercury is introduced, the patient is left to himself, and the surgeon is at once at liberty.

4. *Pressure.* Mr. Lloyd lately cured a case of hydrocele by pressure—tightly strapping up the testicle directly after evacuating the fluid. The pressure was kept up for three days, by which time hernia humoralis was established; since which the patient has gone on precisely in the same course as is usual after vinous injection.

5. *Vinous injection.* This method was adopted in the case which elicited the preceding remarks. After puncturing the sac, and drawing off about thirty ounces of greenish yellow fluid, Mr. Lloyd injected a pint of undiluted port wine, which was allowed to remain for fourteen minutes.—*London Journal of Medicine, Feb.* 1850, *p.* 190.

110.—*On Incontinence of Urine in Children.* By JOHN SIMON, Esq., F.R.S., Surgeon to St. Thomas's Hospital.—[Mr. Simon directs attention to the fact, that when irritability of the bladder exists in children, it is usually attended with a copious cayenne-pepper deposit of lithic acid in the urine. In a clinical lecture on this subject he says:]

Irritability of the bladder in children usually takes, with more or less completeness, the form of *incontinence of urine*: the child wets its bed. Whenever this symptom is presented to you, if you proceed to examine the urine, (as in every such case you should do), you may pretty confidently expect to find copious crystals of lithic acid. This condition of the urine in children is very far from painless; and in severe cases the symptoms cannot at first sight be distinguished from those of calculus: the child makes water very often, and a little at a time, doubles itself up, and cries with the pain of each effort, and pinches and pulls its prepuce, just as it would with stone in the bladder. The pain experienced is a severe scalding in the urethra, and sometimes this passage will be so much irritated as to inflame and secrete pus. You have recently seen a case under my treatment in Abraham ward, which, though not one of incontinence of urine, (for it was in an adult), will yet serve to show you the manner of dealing with such inconveniences, generally, as depend on the passage of crystals of lithic acid in the urine. The patient, Wm. Matthews, aged twenty-two, had for two or three years suffered occasionally with symptoms, which make it probable that he has a calculus lodged in his left kidney; but the immediate cause of his admission to the hospital (Dec. 18), was the circumstance of his then habitually passing lithic acid gravel, occasionally mixed with blood. His urination was frequent and painful. His pulse was feeble, and he was of little muscular power; his skin acted fairly; his tongue was white and coated; his bowels a little constipated. I ordered him five grains of Plummer's pill every night till his tongue was quite clean, and then changed the treatment, giving him quin. disulph. gr. ii. twice a day, and potass. bicarbon. half a drachm, five hours after his chief meal. He left the hospital, after a month's stay, quite free from uneasiness in his urinary organs, and materially improved in general health.

This case will illustrate to you the sort of treatment which I generally pursue in similar instances of chemical derangement of the urine. If the tongue is coated, and if (as is usually the case with children) the intestinal secretions are unhealthy, I give hydrarg. c. cretâ, or some other preparation of mercury, till that evil is remedied; I then commence the exhibition of alkalies, giving usually a single large dose daily, after the completion of the digestion of the chief meal of the day; and almost invariably I find it highly advantageous to give quinine twice a day during the same period. In my hands, it has answered far better than any preparation of iron, and especially so in the combination I have mentioned. I give it usually before breakfast and before dinner, and the alkali in copious solution five hours after the latter meal. Extreme attention to the quantity, quality, and simplicity of the diet, is essential.

With this treatment you will seldom, I think, have occasion to resort to blistering over the sacrum and other measures of a similar nature, which have been recommended for the cure of incontinence of urine in children.—*Lancet, March* 9, 1850, *p.* 290.

111.—TABLE FOR EXAMINING URINARY CALCULI.

By Dr. H. Bence Jones, F.R.S., &c.

(Lancet, Feb. 2, 1850, p. 138.)

1. *By Heat.*	2. *By Acids.*	3. *By Alkalies.*	*Nature of the Calculus.*	*Special Tests.*
Destroyed by heat.	With nitric acid, red.	Soluble in carbonate of potash, evolving ammonia.	Urate of ammonia.	Soluble in water, when boiled. Solution in water, with a few drops of ammonia, evaporated, crystallizes in needles, (microscopic.)
		Soluble in carbonate of potash, evolving no ammonia.	Uric acid.	Solution in caustic ammonia or potash, on the addition of an excess of acid crystallizes in angular crystals. Not soluble in water.
	With nitric acid, not red.	In ammonia soluble, crystallizing when evaporated.	Cystine.	Soluble in strong caustic potash; the solution, boiled for a few moments on the addition of a drop of dilute acetate of lead gives sulphuret of lead.
		In ammonia with difficulty soluble, not crystalling.	Fibrin.	With nitric acid becomes bright yellow. Solution in caustic potash precipitable by acetic acid in amorphous form.
Not destroyed by heat.	With hydrochloric acid soluble; before heating effervesces.	Solution in acid, when neutralized, gives a precipitate with carbonated alkalies and oxalate of ammonia.	Carbonate of lime.	Soluble in dilute acetic acid, with effervescence.
	With hydrochloric acid soluble; after heating effervesces.	Solution in acid, when neutralized, gives a precipitate with carbonated alkalies and oxalate of ammonia.	Oxalate of lime.	Insoluble in acetic acid. Boiled with carbonate of soda, oxalate of soda is dissolved, precipitated by chloride of calcium.
	With hydrochloric acid soluble; without effervescence with or without heat.	Solution in acid, with excess of ammonia gives a crystalline precipitate.	Phosphate of ammonia, & magnesia.	With half its bulk of phosphate of lime, (bone-earth), is very fusible by the blow-pipe.
		Solution in acid, with excess of ammonia gives an amorphous precipitate.	Phosphate of lime.	With twice its bulk of phosphate of ammonia and magnesia, is very fusible by the blow-pipe.
Not acted on.	Not acted on.	Not acted on.	Silica.	Fused with twice its bulk of carbonate of soda, forms glass, soluble in water, precipitable by hydrochloric acid.

DISEASES OF THE SKIN.

112.—ON THE USE OF ACETATE OF POTASH IN SKIN DISEASES.

By Dr. J. A. Easton, Physician to the Glasgow Infirmary.

[Dr. Easton was led to the employment of acetate of potash in skin diseases, from reading the lectures of Dr. Golding Bird, delivered in 1848, before the College of Physicians (See 'Retrospect', Vol. XVIII., p. 55). The remedy was used by Dr. E. in cases of Psoriasis, Lepra, and Eczema; and not only was the treatment in every instance successful, but the period required for the cure was considerably less than it is under the use of ordinary remedies. The dose of the acetate of potash was usually half-a-drachm three times a-day. Dr. Easton makes the following remarks on the effects and modus operandi of the medicine:]

In the first place, the administration of the salt was followed by a great increase in the amount of urine. Making allowance for difference in season, difference in the state of the atmosphere, and for other causes which are known to influence the secretion of urine, I need scarcely remind you, that the average quantity voided during twenty-four hours, —and I certainly do not take the lowest standard -is about 40 ounces, or 2½ pounds. Now, the smallest amount of urine which was voided in the cases under review, was 54 ounces; while the greatest was 7½ pounds, or 120 ounces,—there having been, in the case in which the amount was lowest, an increase of 14 ounces; and in those cases in which it was highest, an augmentation of 80 ounces over the ordinary quantity. These facts speak conclusively, I think, as to the diuretic power of the acetate of potash. But the term diuretic is of vague signification,—at all events, two very different results follow the administration of different classes of remedies, each of which is comprehended under the general appellation of diuretics. Thus, some of these increase merely the amount of the *water* of the urine; others, the amount of its *solid constituents*, urea, lithic acid, and the salts. Under the former may be ranked broom, juniper, squill, digitalis, and to use the language of Dr. Golding Bird, "all those agents which out of the body exert no chemical effect on animal matter." Such substances, which Dr. Bird calls renal hydragogues, appear to influence exclusively the Malpighian bodies of the kidneys,—that delicate expanse of capillaries to which, as has been shown by Mr. Bowman, has been entrusted the duty of separating the water that is discharged from the blood by the renal glands. I am of opinion, then, and the facts submitted warrant the conclusion, that the acetate of potash increases the water of the urine,—in other words, that it acts as a renal hydragogue. But it performs, when administered, a more important part in the animal economy, and renders more essential service in the removal of disease than what is imparted by its simply hydragogue influence; and this leads me to consider another effect of the salt, which I am anxious to call attention to, as having been manifested in the cases under consideration.

II. It was formerly remarked, that some of the medicines called diuretics increase the quantity of the solid constituents of the urine; and I now proceed to show, in the second place, that the acetate of potash possesses this property in so remarkable a degree, as fully to entitle it to be considered a renal alterative or blood-depurant, as well as a renal hydragogue. The elimination from the blood of the solid constituents found in the urine may be considered the function of the kidney *par excellence;* for, while this gland undoubtedly separates superfluous water from the circulating mass, it cannot be said, if I may be allowed the expression, to possess a monopoly in that respect, seeing that superfluous water is likewise discharged by the lungs and the skin. But it is specially—I may say exclusively—the office of the kidney, as well to de-acidify the blood, as to rid it of redundant nitrogen,—effecting the former of these objects by loading the urine with acid salts; the latter, by elaborating and excreting urea and lithic acid. Accordingly, the amount of these nitrogenous compounds in the urine, both of which, according to Dr. Bird, are produced from the metamorphosis of nitrogenised elements of worn-out tissue or mal-assimilated food, may be assumed as a measure of the amount of the destructive assimilation of nitrogenised tissues or other matters in a given time; for it may be regarded as a general exceptionless fact, and be enunciated with the emphasis of a general law, that all soluble matters in the blood, which are either not able, or are not needed, to contribnte to the growth and reparation of the tissues, are ejected by the kidneys. Now, while the investigations of Mr. Bowman have shown, as already stated, that the Malpighian capillaries separate the water of the urine, it has also been established by the same distinguished physiologist, that the separation of the solid constituents, or what may be called the peculiar urinous principles, is effected by the cells which line the tortuous uriniferous tubes, exercising their secreting power for that purpose on the blood of the portal capillary plexus, with which the bodies of these tubes are in intimate contact. The amount of these urinous principles influences, of course, the density of the urine, and while the exact amount of them which is voided in a given time can only be determined by a quantitative analysis of that fluid, still, by attending to its specific gravity, we can ascertain whether they be above or below the normal amount. The specific gravity of water being estimated at 1·000, that of healthy urine ranges, as is generally understood, between 1·015 and 1·025; but, from a very painstaking and very extensive observation of this matter in our hospital, my friend and colleague, Dr. MacGregor, whose original researches into the pathology of diabetes entitle him to all credit for accuracy and trustworthiness, has come to the conclusion, that 1·016 is the number which expresses more correctly than any other the specific gravity of healthy urine. To the correctness of this statement my own little observation of this point leads me to subscribe. If, then, 40 oz. of urine, of sp. grav. 1·016, be voided on an average in twenty-four hours, is there any mode short of performing a quantitative analysis—a proceeding not likely, for many reasons, to be had recourse to generally—by which we can estimate, more precisely than by merely contrasting the difference between 1·000 and 1·016, the waste of tissue which has

taken place during that period in the noiseless laboratory of the organism? On this point Dr. Bird supplies information so practically important that I make no apology for quoting from him nearly *verbatim*. After urging the necessity of ascertaining the integrity of the blood-depurating function of the kidney, and acknowledging, at the same time, the practical difficulties of doing so by evaporating the urine to as dry an extract as can be obtained, he calls attention to the advantages presented by the more rapid and easy determination of the quantity of solids from the specific gravity of the urine, and then subjoins a table, which he has constructed for the purpose of ascertaining that point. The peculiarities and the mode of applying this table to practical purposes, will be best gathered from the following sentences:—"Thus, if the specific gravity of any specimen of urine be expressed in four figures, the two last will indicate the quantity of solids in a fluid ounce of the urine, within an error of little more than a grain, when the density does not exceed 1·030; above that number, the error is a little greater. To illustrate this, let us suppose we are called to a patient, the integrity of the depurating functions of whose kidneys we are anxious to learn. The quantity of the urine excreted in twenty-four hours amounts, we will suppose, to three pints, or sixty ounces, and the density of the mixed specimens passed in the time alluded to is 1·020; now, we merely have to multiply the number of ounces of urine by the two last figures of the specific gravity, to learn the quantity of solids excreted, or $60 \times 20 = 1200$ grains." Now, bearing in mind the characteristic function of the kidney, and that the measure of its activity as a blood-depurating organ may be calculated by the specific gravity of the urine, let us see how far the function in question was influenced by the acetate of potash in the cases under consideration; in other words, to what extent the *solid constituents*, as well as the *water*, of the urine, were increased by that salt. In the cases in which the least urine was voided—being 54 oz. in the lowest, and 56 oz. in the second lowest, the specific gravity was respectively 1·019 and 1·017; while in those in which the amount was highest, the specific gravity was 1·012 in one of them, 1·014 in the other—the average quantity voided by each of these patients having been 120 oz. To those who take but a superficial view of this matter, the results just stated in reference to the specific gravity in these cases —particularly in reference to that of the two last—may appear inconsistent with the statement that the acetate of potash increases the solid constituents of the urine, and thereby promotes the depuration of the blood. If such be the case, why, it may be asked, is the specific gravity not above the normal standard, instead of being below it? A moment's reflection will explain the reason, and show that the salt under consideration acts powerfully in promoting the elimination of those peculiar urinous principles which result from the secondary destructive assimilation of effete tissue, mal-assimilated food, and all abnormal products of low vitality and imperfect organization. In all the cases the amount of water holding these solid constituents in solution was materially increased; and it must never be forgotten that, if the *same amount* of solid matter be dissolved in a larger or smaller quantity of water, the specific gravity will be proportionally lower or higher. Thus, when the

menstruum is much increased, the specific gravity may not be above the normal standard, and yet the activity of the kidneys, as blood-depurating organs, may be very great; for with the increased amount of water, there is washed out from the blood an increase of the solid urinous constituents also; and yet, as these are not in a comparatively concentrated solution, but diffused through a large amount of menstruum, the density may relatively be not higher than usual—nay, it may even be lower. Connecting this fact, then, with Dr. Bird's table, and keeping both steadily in view, we shall find that, when 54 ounces of urine were voided, of the sp. grav. 1·019, the blood was depurated to the extent of 991 grains in twenty-four hours; while, when 120 oz. were passed, of the sp. grav. 1·011, the separation of salts and waste of tissues, as indicated by the criterion of the specific gravity, amounted to 1440 grains in the same period. These results, then, furnish, I think, abundant evidence of the power which the acetate of potash possesses in promoting the metamorphosis of tissue, thereby increasing the solid constituents of the urine, and proportionally depurating the blood.

III. But, in the third place, this salt, which is so capable of accomplishing the metamorphosis, not only of ordinary effete tissue and mal-assimilated food, but that, also, of many of those products of low vitality which either constitute, or are the manifestations of, a *materies morbi*,—this salt, I say, thus potent to alter and renovate, is itself altered in its progress through the laboratory of the organism, it being well known that the salts of the vegetable acids are all converted in the system into carbonates, and as such are found in the urine. Now, I think it is susceptible of proof, having the strength almost of mathematical demonstration, that the benefit derived from the acetate of potash in such diseases as those I have spoken of, is owing substantially to its being converted into the carbonate of that alkali. But, before adverting to this change which the acetate of potash undergoes in the system, there are some circumstances connected with the action of the carbonate of potash that require to be noticed at this stage of our inquiry. That the carbonate of potash can exercise a transforming influence over organic compounds out of the body is undeniable. Thus, albumen, digested with an alkali, is broken up into secondary compounds, yielding leucine, formic acid, and the bodies allied to gelatine, called protid and erythro-protid. In like manner casein is broken up into tyrosin, leucine, valerianic acid, and other substances. These being some of the effects which this salt produces out of the body, is it too much to presume, with Dr. Golding Bird, "that, when we cause an alkaline carbonate to circulate through the blood, it exerts an influence on the nascent elements of those matters less highly influenced by life, allied to that which it exerts on dead matter, aids their resolution into substances allied to those produced out of the body, and actually causes the matter to assume so soluble a form as to allow of its ready excretion?"

It may be urged, if the beneficial results spoken of be owing to the circulation of the carbonate of potash in the blood, why not administer the carbonate from the first, rather than trust to its production in the system from the decomposition of the acetate? The answer to this objection

is found in the fact, that the exhibition of the carbonate as carbonate does not produce the effects which follow the administration of the acetate. No doubt the urine may be rendered alkaline by the use of the carbonate, and the aggregate quantity of the excretion may be somewhat increased—in short, the carbonate may alter the reaction of the urine, may act occasionally as a renal hydragogue, but very inefficiently as a renal alterative. The effects of these salts, and the theory deducible from these effects, may be thus expressed in syllogistic phraseology, slightly modified. The acetate of potash increases the solid constituents of the urine; the acetate of potash is converted in the system into carbonate of potash; the carbonate of potash does not increase (materially) the solid constituents of the urine; *ergo*, the effect on the urine of the acetate of potash is due to its conversion into carbonate. The inquiry being thus narrowed, and reduced, as it were, to a focus, it falls, I think, within the scope of legitimate inference to conclude, that the physiological action and therapeutic efficacy of the salt are connected in some manner —unknown, I admit, at present—with the metamorphosis which takes place in itself. With the view of elucidating this matter a little, it may be advisable to look at the chemical composition of the acetate, and the difference which exists in that respect between it and the carbonate. Putting the base out of view as being merely allied to a different acid, we find that acetic acid is composed of—

$$C_4 \quad H_3 \quad O_3,$$

and that carbonic acid is composed of—

$$C \quad O_2.$$

Now, as the hydrogen and oxygen are in equal proportions in the acetic acid, it is clear that these elements will unite to form water, and will leave, consequently, four atoms of free carbon to unite with any body, for which, of course, it has an affinity. But we are not left in doubt as to the individuality of the body with which the carbon combines; for we find that carbonic has been substituted for acetic acid; and we know that this could only have resulted from the union of carbon with oxygen. Nay, more, we know, not only that the carbon has united with oxygen, but we know, further, that eight atoms of oxygen must have been furnished to convert the four equivalents of carbon of every atom of acetic acid into carbonic acid. But these changes which acetic acid undergoes will be made more apparent from the subjoined diagram:—

Conversion of Acetic Acid into Carbonic Acid and Water.

1 eq. Acetic Acid,	C_4	O_3	H_3	4 eq. Carbonic Acid,	C_4	O_8	—
8 eq. Oxygen, .	—	O_8	—	3 eq. Water, . .	—	O_3	H_3
Total, ...	C_4	O_{11}	H_3	Total, ...	C_4	O_{11}	H_3

It becomes a matter of great interest, then, though unfortunately one of great difficulty also, to ascertain whence this large amount of oxygen is supplied. Any opinion, however, on this point, must, in the present state of knowledge, be purely conjectural; yet, at the risk of appearing presumptuous, I shall hazard a few speculations on the subject, which, though they may not carry conviction, will, I hope, excite inquiry, elicit discussion, and perhaps conduct to knowledge; for, to use the beautiful

language of Bulwer, it should ever be remembered that the agitation of thought is the beginning of truth.

There are, I think, only three sources whence the oxygen can be furnished—from the food, the atmosphere, or the organism, including, by this last term, all the products, normal and abnormal, which exist for the time being in the system. As, for obvious reasons, there was no great likelihood of the oxygen having been derived from the food of those patients whose cases have formed the basis of these observations, I pass at once to the consideration of the second and third named sources. It is the opinion of Liebig, that the salts of the vegetable acids, which are converted in the system into carbonates, derive the supply of oxygen necessary for that purpose during respiration. This, however, is given, if I mistake not, merely as an opinion—certainly not supported by demonstrative evidence, and, if I recollect rightly, not even by a reason *why* these salts should appropriate oxygen in their passage through the lungs; and, with all deference to so great a master in science, while no proof is afforded in favour of the opinion, there are one or two circumstances which, I think, are entitled to consideration as militating against it. In the first place, the speculation assumes that the decomposition and reconstruction of these salts are effected in the lungs, and leaves out of view the more likely influence of digestion in effecting such changes. Again, this opinion presupposes a greater activity of the respiratory process while such salts are making the transit of the lungs—an event not appreciable, certainly, by any increase in the number of the respirations. And, if more oxygen be not withdrawn from the air, and it be maintained, notwithstanding, that the supply of the gas necessary for converting acetates, &c., into carbonates, is furnished during respiration, then the advocates of that opinion are shut up to the conclusion that, in order to effect the alteration of certain salts, some part or parts of the organism are deprived of a portion, or, for anything we know to the contrary, of *all* their oxygen—a procedure scarcely in accordance with the general tendency of nature's operations. A theory at least as plausible, I conceive, as this, and one as much in unison with ascertained facts, can be constructed, by supposing that the necessary oxygen is derived from the organism itself. That the effete portion of the organism is being continually disintegrated and resolved into a variety of new forms in the capillary laboratory of the system, is well known and undeniable; is it too much, therefore, to suppose that, amid these ever-varying transitions, a vegetable acid may be broken up and altered, by being brought within the sphere of nascent oxygen, evolved from compounds yielding to the resistless influence of the secondary destructive assimilation? This, however, is all theory — and, probably, very erroneous and untenable theory — and, therefore, though agreeing with Dr. Whewell, that "false theory often proves more advantageous to science than the absence of theory," I shall descend from the airy region of speculation, and leave to others the task of solving this interesting problem in the chemistry of therapeutics.

I have thus submitted evidence, that the acetate of potash is a valuable agent in certain cutaneous diseases; I have also proved that it increases the water of the urine, and its solid constituents likewise; have shown that it is itself converted into a salt, which dissolves and trans-

forms tissues which are but imperfectly organised; and lastly, I have endeavoured to show, that the beneficial effects of the medicine are in some way, yet unknown, connected with the change which is effected in itself. Whatever opinion may be entertained of the theoretical conjectures I have hazarded, I trust my readers will not overlook the practical observations which have been presented likewise; and, in the hope that these will be submitted to the test of experience, I respectfully urge them on their consideration.—*Monthly Journal*, *May*, 1850, *p.* 422.

113.—*On the Use of Phosphorus in Diseases of the Skin.* By Dr. T. H. Burgess.—There is a remedy which exercises a powerful influence on the cutaneous exhalents, and which I can specially recommend in the treatment of the more rebellious forms of diseases of the skin—namely phosphorus. My attention was first directed to this remedial agent during the period of the cholera in 1832, and I then found it successful, when every other remedy had failed, in several cases of that disease, where the vital powers seemed exhausted, and the patient in the lowest stage of collapse. In these cases, it appeared to act as a violent stimulant, principally through the nervous system, accelerating the circulation, and exalting the muscular irritability in the highest degree. I can now recommend it as one of the most valuable medicinal agents we possess in those inveterate cutaneous diseases—leprosy, psoriasis, lupus—in which the skin seems to adapt itself to the morbid condition, which it retains with singular tenacity against all the usual methods of treatment.

The *phosphorous* treatment of these maladies may be either internal or external. The best method of administering the remedy internally is dissolved in oil or ether, and the phosphorated oil or ether then mixed up with powdered gum arabic and mint water. Camphorated lard is the most appropriate vehicle for applying phosphorus externally. Its energetic revulsive properties may likewise be turned to account in certain diseased conditions of the skin. Phosphorus, the iodide of arsenic, cantharides, and the biniodide of mercury, are the most powerful internal remedies for skin diseases we possess.—*Monthly Journal*, *Feb.* 1850, *p.* 149.

114.—ON THE USE OF NITRATE OF SILVER IN THE TREATMENT OF ULCERS, WOUNDS, ERYSIPELAS, &c.

By John Higginbottom, Esq., Nottingham.

[In recommending the local application of nitrate of silver in cases of wounds, &c., and in all acute superficial inflammations, Mr. Higginbottom first endeavours to combat the idea that this preparation is a caustic or destructive agent. He says:]

The nitrate of silver is not a caustic, in any sense of the word. It subdues inflammation, and induces resolution, and the healing process. It preserves, and does not destroy, the part to which it is applied. If

we compare a caustic, as the hydrate of potassa, with the nitrate of silver, we find that the hydrate of potassa destroys, and induces a slough and the ulcerative process; but if we touch a part with the nitrate of silver, the eschar remains for a time, and then falls off, leaving the subjacent parts healed.

If an ulcerated surface, secreting pus, be touched by the nitrate of silver, the succeeding discharge is immediately converted into lymph: it is the property of the hydrate of potassa, on the contrary, to induce not only ulceration but suppuration. In short, the peculiar properties of the nitrate of silver have long been kept unknown to us by the designation of lunar caustic, affording the most striking instance of the influence of a term, or of a classification, upon the human mind. The nitrate of silver and the hydrate of potassa, (as indeed all caustics), are as the poles to each other; the first preserves, the second destroys; the first induces cicatrization, the second ulceration.

I have for some years past used the nitrate of silver in solution, as well as in the solid state, finding the concentrated solution more convenient for application, where the nitrate of silver has to be applied on a considerable surface, as in erysipelas, &c. The following is the formula I have of late used: nitrate of silver, four scruples; distilled water, four drachms. Put the nitrate of silver into a half-ounce bottle, add the distilled water; the nitrate of silver will be dissolved in a short time, and if rightly prepared the solution will be clear and transparent; this quantity may be kept conveniently in the pocket of the surgeon, for daily use. The solution may be applied with a small piece of sponge, an inch in length, and one-third of an inch in breadth, stitched on the eye at the end of a common silver probe; this makes a most convenient instrument, which may be kept in the pocket-case; it is not only useful for external inflammation, but can be used to internal parts of the throat, &c. Precaution should be taken to wash the sponge *well* with water after using it.

When the solid form of the nitrate of silver is used, it is necessary to moisten the surface to which it is applied, slightly, with pure water, and apply a long stick of the nitrate of silver *flat* upon the moistened surface, taking care that it be applied to every affected part.

It is necessary, for the successful application of the nitrate of silver, that the surface of the skin be free from any oleaginous matter, loose cuticle, or any other extraneous substance; the parts should be well washed with soap and water, and afterwards with water alone, to remove any particle of soap remaining.

It is essential to know the precise effect of the nitrate of silver, in the different degrees of its application. If the nitrate of silver be passed once slightly over the moistened skin of any part, except the hands or soles of the feet, (upon which the cuticle is thicker than elsewhere), it induces an eschar, simply; if it be passed over the surface twice or thrice, to the eschar will be added some vesication; if more still, there will be vesication only. In the first place, there will be no pain; in the second and last, there will be soreness proportionate to the degree of vesication.

It is essential to the success of this plan of treatment, that these observations be kept constantly in view.

I shall now describe the mode of application of the nitrate of silver in the treatment:—

Of recent bruised wounds of the shin, &c.—In recent bruised wounds of the shin, the nitrate of silver should be applied on the wound, taking care to leave no spot untouched, and upon the surrounding skin, to the breadth of one-third of an inch, in such a manner as to induce an eschar, without vesication. Any moisture which may remain upon the wound is then to be removed by gently wiping the part with a little linen or lint, and the skin surrounding that on which the nitrate of silver was applied is to be moistened, and covered with gold-beater's skin, so that the whole may be protected from accident; the parts are then to be kept cool, free from covering, and exposed to the air.

This is usually all the treatment required in this kind of injury. It will be generally found, that an adherent eschar is formed, and that no further application or attention is required, excepting in old people, in whom the skin is sometimes irritable from various causes; in this case, a little fluid will form under the edges of the eschar, and will require to be evacuated by a small puncture, the goldbeater's skin being removed for this purpose, and then re-applied.

If the eschar be removed by accident at any time, the application of the nitrate of silver must be repeated as before. If due care be taken to avoid this kind of accident, it will not in general be found necessary to enjoin rest.

Of small ulcers.—The same method of applying the nitrate of silver may be used in small ulcers as in bruised wounds, particularly in exposed situations, as on the face, head, and hands; in these situations the eschar often becomes adherent from the first application, but should the first attempt fail, and the eschar be unadherent, from fluid forming under it, a poultice of bread-and-water should be applied, for eighteen or twenty-four hours, to remove the eschar; when this is done, it should be treated as in larger ulcers, hereafter directed, which generally effects a cure with one or two applications.

Of large ulcers.—I have abandoned the attempt of healing large ulcers by the unadherent eschar, on account of the inconvenience and trouble attending the evacuation of the fluid from beneath the eschar, which is daily necessary to insure an adherent eschar.

The best treatment is as follows:—Apply the nitrate of silver twice over the ulcer and surrounding skin, then cover the ulcer with a piece of black lint,* and upon it a plaster of neutral ointment,† spread rather thick on linen, a compress of linen, and a calico roller lightly applied to secure the whole. This plan is attended with much less trouble, and requires the attention of the surgeon only every third or fourth day. The same remark may be here made of ulcers as of inflammation, which is of

* Black lint:—Nitrate of silver, two drachms; distilled water, four ounces. Mix, and make a solution. Saturate an ounce of fine lint in this solution; then let the lint be exposed in a flat, shallow vessel, to allow it to dry, by evaporation.

† Neutral ointment:—Lead plaster, eight ounces; olive oil, eight ounces; prepared chalk, four ounces; distilled vinegar, eight ounces. The acetic acid and the chalk must be well mixed in a mortar, and the lead plaster and the olive oil, previously slowly melted together, are to be added. The whole is then to be stirred together until cool.

great practical importance respecting the action of the nitrate of silver, that its influence is exerted for three days in an active state, and declines on the fourth; on that account, any intermediate dressings are unnecessary. In small ulcers, a second application of the nitrate of silver in substance is often not necessary, as the black lint, by absorbing the moisture, becomes firmly adherent, and remains on the ulcer until it is healed; if not healed when the lint comes away, a repeated dressing every fourth day, of black lint and neutral ointment, is required.

Of old ulcers of the legs.—Old ulcers of the legs have long been the opprobrium of surgery, and I recollect the following remark made in one of our periodical works soon after the publication of my essay 'On the Use of the Nitrate of Silver,' that "old ulcers of the legs, in 1830, would be old ulcers of the legs in 1840;" that no improvement would be made in the surgical treatment.

After the lapse of nearly twenty years, I am led to conclude that there has been a very manifest improvement in that department of surgery—not so much by the permanent cure of old ulcers of the legs by the use of the nitrate of silver as I anticipated, but by what is far better—the prevention by the early use of that remedy.

I have no doubt that if these directions for the treatment of external inflammation, in bruised wounds, and also that of recent ulcers, with the occasional assistance of graduated pressure, were followed, we should seldom have severe cases of old ulcers of the legs.

From my own observations and inquiry, I am led to believe that they have materially decreased in number in this locality, both in hospital and private practice; indeed, so much so, that if I were to commence my treatment as I did twenty-four years ago, I should have great difficulty in finding one-half the cases I then readily obtained, notwithstanding there is an increase of one-third more of inhabitants.

Of ulcers attended with inflammation.—If ulcers attended with inflammation should occasion constitutional disorder, I would prescribe the patient an emetic of ipecacuanha, a calomel pill, followed by an active saline purgative; to apply bread-and-water poultice, every eight hours, on the ulcer; and cloths, moistened with cold water, constantly over it and the inflamed part, as an evaporating lotion; and to keep in bed for twenty-four or thirty-six hours.

After this period, the treatment as directed for ulcers, with the nitrate of silver, black lint, and neutral ointment, &c., may be generally pursued. Should there still be swelling or œdema arising from the ulcer, it will be necessary to enjoin absolute rest in bed, or under such circumstances the ulcer will not heal.

Of punctured wounds, bites, and stings.—In recent punctured wounds the orifice must be first examined. If there be any extraneous body within it, or loose skin surrounding it, they should be first removed. A drop of water should be put on the puncture, and the surrounding skin slightly moistened. The nitrate of silver is to be applied to the former, until some pain be experienced; and over the latter lightly, so as not to induce vesication. It should be applied to the skin for an inch round the puncture, and to a greater extent, if the swelling exceeds this space. The part is then to be exposed to the air.

These cases are generally adherent from the first application of the nitrate of silver; but I have sometimes found the eschar to separate from the wound before it has quite healed, owing to its conical form; it is then only necessary to repeat the application of the nitrate of silver slightly, to complete the cure.

At a later period of punctured wounds, inflammation is usually present; the punctured orifice is nearly closed by the swelling, and a little pus or fluid has generally formed within. A slight pressure is to be applied to evacuate this fluid, a drop of water should be put on the orifice, and the nitrate of silver is then to be well applied within the puncture and upon and a little beyond the surrounding inflamed skin, as before directed, and the parts are to be exposed to dry. In this manner an adherent eschar is formed, and the inflammation subsides. If there be any vesication it may be simply left to nature; the fluid is soon absorbed or evaporated.

If there be reason to suppose that an abscess has formed deeply, it must be opened freely with the lancet, and the nitrate of silver is then to be applied on the cavity and on the surrounding inflamed or swelled skin. A poultice of bread-and-water, and cold water as a lotion, is then to be applied over the whole. The application of the nitrate of silver may be repeated every second or third day if the swelling or inflammation require it, and the cold poultice may be renewed every eight hours.

I have several times applied the nitrate of silver over an inflamed surface when I was not aware that suppuration had taken place. Even in these instances an immediate check was given to the surrounding inflammation, and relief to the pain, but two or three days afterwards there was increase of swelling attended by some pain, which is not usual excepting when there is matter or some extraneous body underneath.

In these cases a free incision must be made with the lancet, and afterwards apply the nitrate of silver and cold poultice.

In doubtful cases, where suppuration may be expected, it is advisable to apply a poultice after the nitrate of silver, as the part may be in a fitter state to detect any matter, than if a hard eschar be over it.

The bites of animals and the stings of insects have a speedy remedy in the nitrate of silver, if applied as directed in punctured wounds.

Of wounds received in dissection.—Previous to a post-mortem examination, as a precautionary measure, any sores or scratches on the fingers or hands should have the nitrate of silver applied to them to form an eschar.

After a post-mortem examination, wash the hands well in tepid water, then bathe them with salt and water, so that any small wound or abrasion may be detected by the smarting pain occasioned by its application; this is especially desirable after a post-mortem examination of abdominal inflammation and of puerperal patients, as a number of fatal cases have occurred from very slight wounds unobserved at the time. Every suspicious spot should be then moistened with a little water, and the nitrate of silver freely applied on the affected parts, and over the surrounding skin, to form an eschar. This plan will be a most effectual preventive of mischief in recent injuries.

If the puncture be deep, it will be necessary to suck the part well first, then put a drop of pure water on the orifice of the puncture, and apply the nitrate of silver well, so as to occasion a smarting pain within the wound, and apply it lightly on the surrounding skin.

In the second stage, when the wound becomes painful or inflamed, and there is a tumour or elevation of the skin, the removal of the small tumour with the lancet, or a crucial incision must be made through it, and then apply the nitrate of silver on the wound, and on, and beyond, the inflamed and swollen parts; if on the following or subsequent days the inflammation spreads, the application of the nitrate of silver should be repeated; an ipecacuanha emetic, followed by a purgative, would be desirable, if the digestive organs are affected.

In the third stage, inflammation is rapidly spreading, violent constitutional symptoms are present, and the violent knocking pain in the head peculiar to this stage. Venesection, ipecacuanha emetic, followed by a purgative, two grains of calomel with two grains of James's powder, every three or four hours, till the mouth is affected, appear to be the best treatment. The nitrate of silver should be applied freely on all the inflamed surface, and along the inflamed absorbents.

Wounds from the bites of rabid animals..—I read a paper some time ago, in a work on veterinary surgery, where the writer mentions his entire confidence in the application of the nitrate of silver to the bites of rabid animals.

An objection has been made to the excision of the part alone, on account of the danger of the virus from the bitten wound being conveyed to the recent wound made with the scalpel. To avoid this, the parts may first be well washed with warm water, with the assistance of Read's, or any powerful syringe, to remove the saliva away from the wound; the nitrate of silver should then be freely applied within the wound, after that the bitten part should be removed with the scalpel, and afterwards apply the nitrate of silver again to the wound, making doubly sure of having the poisoned parts removed. The sores to be healed by eschar.

Of lacerated wounds.—After the wound has been well cleansed, and foreign matters removed, the nitrate of silver must be applied close upon the irregular edges of the wound, but not within the wound, and on the surrounding skin; afterwards the parts should be brought into approximation by straps of adhesive plaster, to be healed by the first intention. Should the laceration be considerable, the interrupted suture may be used with the same success and safety as in an incised wound, but the suture must be applied *before* the application of the nitrate of silver; the nitrate of silver should be applied on the edges of the wound, on the *line* of the wound, and on the surrounding skin; the parts should be supported by adhesive straps, without any other covering; the ligature may be removed about the third day, and the nitrate of silver applied to the small orifices left, to prevent any ulceration.

Great advantages are derived from healing wounds, particularly on the face, by the aid of the nitrate of silver.

1. It prevents the irritation arising from the irregular edges of a lacerated wound; adhesive inflammation takes place, and the wound is healed by the first intention, as in an incised wound.

2. The inflammation, swelling, and irritative fever consequent on lacerated wounds are in a great degree prevented, and there being no ulcerative process, there is no loss of substance, so that unsightly scars and raised cicatrices are prevented.

To arrest the hemorrhage from leech-bites.—Apply the point of a stick of the nitrate of silver firmly within the little orifice for a short time; then a small piece of black lint must be firmly pressed on the part with the finger for two or three minutes; by this means the bleeding is effectually stopped; the black lint becomes firmly adherent, adhesive inflammation is produced, and the lint does not separate till the leech-mark is healed.

Incised wounds.—Apply the nitrate of silver slightly on the skin surrounding the wound, *not within the wound,* and bring the edges of the wound together with adhesive plaster, or uninterrupted sutures; by this means any subsequent inflammation or swelling of the skin is prevented, and the wound heals by the first intention. In the operation for hare-lip, or in wounds on the face, adhesive inflammation is immediately produced by this treatment, and the cure safely affected. When the ligatures are removed, the small orifices remaining should be touched with the nitrate of silver, to prevent any ulceration.

Of erysipelas.—In very slight attacks of erysipelas, sometimes an active purgative and low diet will be sufficient to remove the disease without the application of the nitrate of silver; but if constitutional symptoms are present, it is the safest plan to use both constitutional remedies and the nitrate of silver simultaneously.

The constitutional remedies, as the case may require, are venesection, emetic, purgative, and repeated doses of chloride of mercury and James's powder. The nitrate of silver to be applied as follows:—Wash the affected parts well with soap-and-water, then with water alone, to remove any particle of soap remaining, afterwards wipe the parts dry with a soft cloth; then apply the concentrated solution of the nitrate of silver two or three times over the whole inflamed surface, and beyond it on the surrounding healthy skin, to the extent of two or three inches. In about twelve hours it will be seen if the solution has been well applied. If any inflamed part be unaffected by it, it must be immediately reapplied to it. Sometimes even after the most decided application of the nitrate of silver, the inflammation may spread, but it is then generally much less severe, and it may be eventually checked by the repeated application of this remedy.

It is desirable to visit the patient every twelve hours, till the inflammation is subdued.

By this means, we have a complete control over the disease. If the erysipelas is attended by vesication, the vesicles should be broken and the nitrate of silver applied on the denuded, inflamed parts, but if the vesicles arise from the use of the nitrate of silver, they may be allowed to remain undisturbed.

In erysipelas of the face, when it is spreading on the forehead, or at all on the scalp, the head should be shaved as early as possible, that the extent of inflammation may be traced on the scalp, which often can only be detected by pain, or by œdema being felt on pressure with the finger.

The solution requires to be applied very freely all over the scalp, where it scarcely or never produces vesication.

When the inflammation has been subdued by an early use of the nitrate of silver, the constitutional symptoms have been immediately relieved; the constitutional disturbance is directly aggravated by the least increase of local inflammation, and in a few hours, after a decided application of the nitrate of silver, the inflammation has been arrested, and gradually subdued, and with it the constitutional symptoms cease.

Even in idiopathic erysipelas, there is no period of the disease when I would not apply the nitrate of silver; I have never in any cases seen metastasis or any other bad effect from the use of this important remedy; on the contrary, I think it the best local remedy to prevent such mischief.

On phlegmonous erysipelas.—An early application of the solution of nitrate of silver alone sometimes will be sufficient to check the progress of the inflammation.

If the inflammation be severe, attended with swelling, and the subcutaneous cellular tissue be much affected, a number of leeches should be applied on the inflamed part, or small incisions made with a lancet; a bread-and-water poultice applied, until the bleeding has ceased, then the concentrated solution to be applied freely upon and beyond the inflamed parts, and afterwards covered with a plaster of the neutral ointment, if suppuration be anticipated, if not, the parts should be exposed to the air, to form an eschar.

If the leech-marks or incisions afterwards become painful or irritable, a slight application of the nitrate of silver will be required.

By the above method of treatment, the inflammation is arrested and subdued, the suppurative process often prevented, and long incisions unnecessary. Should the system be affected, ipecacuanha emetics, saline purgatives, and repeated doses of calomel with James's powder.

On inflammation of the absorbents.—Constitutional remedies are often required, as venesection, emetics, purgatives, &c., and an immediate attention to the origin of the disease. If from a foreign substance, it must be removed; if from an abscess, it must be freely opened; or from an irritable ulcer, the nitrate of silver should be applied, to destroy the irritation. The nitrate of silver should then be applied, either in substance or the concentrated solution, freely, upon the whole of the inflamed and swelled surface, along the lines of inflammation, and beyond them on the surrounding skin. By these means, in twenty-four hours, the disease is generally most effectually arrested in its progress, and the numerous abscesses often occasioned by this kind of inflammation prevented.

Phlegmonous inflammation.—Pure phlegmonous inflammation will be often arrested and subdued by the early application of the nitrate of silver, without any other remedy; but if it has proceeded so far as to be doubtful whether suppuration has taken place or not, the inflammation will be arrested, and the suppuration more circumscribed and limited in its extent.

If the tumefaction and inflammation are not subdued in four days

after the application, it will be found that suppuration has taken place, and that the use of the lancet will be required to open the abscess, after which the wound will more rapidly heal than if the nitrate had not been used. The cold poultice may be applied every eight hours, and the nitrate of silver every second or third day, as required.

Small irritable ulcers with varicose veins.—Fill the small ulcers lightly with scrapings of the black lint, and cover them with a plaster of the neutral ointment, and apply graduated pressure with a bandage on the leg; it often happens that an adherent eschar is formed after the first application, but if not, the remedy must be repeated every third or fourth day. A bandage or laced stocking should be continued.

Burns or scalds.—In the first class of burns or scalds, where there is superficial inflammation, and in the second where there is simply vesication without destruction of the cutis, the application of the nitrate of silver as directed in erysipelas, often effects a speedy cure; the vesicles should be removed, and the nitrate of silver applied on the exposed cutis, to form an eschar. If future dressings are required, the black lint and neutral ointment may be applied every third or fourth day. Should the burn or scald be exposed to friction on any part of the body, a plaster of the neutral ointment applied with a light bandage over it will be necessary.

In burns from the explosion of gunpowder, particularly on the face, the mode of healing by eschar with the nitrate of silver is very successful.

Gangræna senilis.—An early application of the nitrate of silver is indispensable to give a chance of checking the progress of this dreadful disease. It has been used with decided success when the toes have assumed a dark colour, and become a little swollen, with purple vesications on the lower and outer part of the leg. The solid nitrate of silver may be applied (the affected parts being previously moistened with water) freely on the affected toes, and lightly on the surrounding healthy skin; and also on the denuded skin after the vesicles have been removed, so as to form an eschar. If successful, the eschar becomes adherent, the inflammation is subdued, and all further mischief prevented. In due time the eschar will be thrown off, leaving the parts underneath healed.

It will be desirable to give purgatives, and adhere to an antiphlogistic regimen during the cure.—*Lancet, Jan.* 19, 1850, *p.* 74.

115.—*On the Treatment of Erysipelas by Collodion.* By Dr. JOHN SNOW, London.—[The application of an adhesive compound, in order to arrest inflammation of the skin, having been recommended by M. Latour, of Paris, Dr. Snow makes the following remarks upon the subject:]

In a paper on 'Inflammation,' which was read at the Westminster Medical Society, and reported somewhat fully in 'The Lancet,' in the early part of 1843, I was led to recommend this treatment, from a consideration of the causes which promote the circulation in the capillary bloodvessels, as well as from the result of experiments by MM. Breschet and Becquerel, in which the skin of animals was covered with varnish,

and from the effects of covering a portion of my own skin closely with oil-silk. The following passages are quoted from the report of that paper:—

"There was one indication which might be fulfilled with safety and advantage in every case of inflammation of the skin—that was, to stop the cutaneous transpiration, which, being the chief function of the skin, promoted the circulation in its capillaries, and thereby kept up its temperature. . . . . On this principle he believed that the benefit of water dressings and poultices chiefly depended, as well as the application of lunar caustic and of flour in erysipelas, the former making a dead, and in a great measure, an impermeable, membrane of the cuticle, and the latter likewise interfering with transpiration." ('Lancet,' Feb. 25, 1843, p. 805-6.)

Since the introduction of collodion, I have applied it in erysipelas, with apparently great advantage. In a case of erysipelas of the face and head, which occurred in a lady about thirty years of age, in April last year, this was the only local application. It was applied once every day, to the whole inflamed surface. The first application to every newly-inflamed part always afforded immediate relief. At the end of six days the inflammation had quite disappeared, and the patient was convalescent. It is in the first stage of inflammation of the skin that protecting it from the air appears to be of most service.—*Lancet, April* 27, 1850, *p.* 502.

116.—*On Venereal Cutaneous Eruptions.* By BRANSBY B. COOPER, Esq., F.R.S.—In this form of "secondary symptoms" a doubt always arises in my mind as to whether the eruption can be attributed to the immediate action of syphilis, or whether it may not be regarded as the result of a constitutional tendency, only developed by the action of the syphilitic poison, and the appearance of the eruption being also modified by the same agency. Perhaps the most common form of cutaneous eruption in syphilis is the papillary, as lichen, which is to be distinguished from the idiopathic disease by the dirty copper brown colour of the skin, and the peculiarly superficial appearance of the stain, which gives the idea that it may be easily removed by washing. It is also much less irritating than the ordinary disease. The papular is the form which the disease usually assumes in children. This eruption will sometimes pass into the pustular form, which renders its classification difficult; but still the specific colour sufficiently stamps it as a venereal eruption.

In this form of eruption, Plummer's pill, and large doses of sarsaparilla, are the remedies which I generally employ: sometimes, however, I give small doses of the bichloride of mercury, with the sarsaparilla, in the place of the Plummer's pill.

I think I have found the scaly eruptions appear next in order in point of frequency to the papular just described, and have sometimes seen pityriasis in the first eruption of venereal disease; but the character of the disease is then likewise marked by its peculiar copper colour: it sometimes commences as a smooth elevation or as a dirty blotch before it passes into its scaly condition.

Lepra and psoriasis are also common forms of secondary scaly eruptions, modified, however, in appearance by the venereal poison.

These squamous diseases I invariably treat with mercury, but have lately employed the mercury in combination with iodine and arsenic, under the form of Donovan's solution.

The tubercular form of the venereal disease comes next in order, and usually presents itself as acne, constituting a distinct hard inflamed tubercle, having a tendency to slowly suppurate. The tubercles appear especially on the forehead, face, neck, and shoulders, but rarely attack the lower parts of the trunk. Their specific characteristic is, as in the other kinds of eruption, indicated by a peculiar dusky colour: the venereal taint is, however, sometimes very difficult to distinguish, when the eruption appears in those whose constitutions have been broken down by hard drinking; and the diagnosis is important, as mercury is the appropriate remedy when the disease is influenced by the venereal poison, but quite inappropriate when the disease appears as a consequence of dissipation. Lastly, there are two other forms of venereal cutaneous disease, but these have generally been considered as tertiary in character, although I confess that I do not distinctly understand what is meant by "tertiary symptoms;" but if it be true that these eruptions be neither capable of being propagated by inoculation nor hereditarily, they deserve a distinct place in the category of venereal disease; the eruptions to which I allude are impetigo and ecthyma of the pustular, and rupia of the vesicular order. These diseases are not to be treated by mercury, but by iodine and the iodide of potassium, and when the vital powers of the patient are greatly diminished, bark and the mineral acids are indicated; but generally change of air, especially to that of the sea-side, seems to prove the most effectual remedy, at the same time iodide of potassium ought again to be given when the constitution of the patient is sufficiently restored.—*Med. Gazette, Jan.* 11, 1850, *p.* 48.

117.—*On the Treatment of Scabies by Lard.* By Prof. BENNETT, Edinburgh.—Since the connection of scabies with a peculiar insect (*Acarus Scabiei*) has been understood, it has been suggested that the good effects of sulphur ointment are not so much to be attributed to any specific properties of the sulphur, as to the destructive operation of the fatty matter, which, by stopping up the respiratory pores of the insect, causes its death. Some time ago I saw in the 'Annales de Thérapeutique,' an account of the treatment of scabies by M. Griffi of Sardinia, who cured the disease by the simple application of olive oil or lard. The following cases, which have occurred in the clinical wards, will illustrate the effects of this practice:—

Case I.—A boy (of whose case I cannot at present find the record), about 10 years of age, entered the clinical ward at the commencement of last session, with the back of his hands covered with numerous ecthymatous pustules, associated with vesicles of scabies, which were most abundant between the fingers and on the wrists. They had existed for some weeks, and caused great irritation and itching. The hands and

wrists were ordered to be covered with simple lard morning and night. On the next day it was found that the parts were dry, and that he was continually irritating them by scratching. To prevent this, and to keep the parts moist, the hands and wrists were ordered to be enveloped in oil-silk bags. A continuance of this treatment for five days entirely removed the eruption.

Case II.—Anne Daly, aged 17, a bleacher, was admitted, November 20, 1849, with an eruption on the hands and flexor-surface of the arms, consisting of large ecthymatous pustules, mingled with numerous acuminated vesicles of scabies. These latter were most numerous between the fingers. The disease was of twelve days' standing, and no contagion could be traced. The affected parts were ordered to be smeared with simple lard, and enveloped in oil-silk bags, as in the last case. This practice was continued until the 26th, when the pustules had disappeared, leaving bluish-red spots devoid of cuticle. A few vesicles were still visible. In two more days these also had disappeared, although she was not dismissed until December 4th, when no trace of the eruption was discernible.

Case III.—James Monro, aged 20,, admitted November 7th, 1848. His hands, arms, and lower portion of abdomen are scattered over with vesicular scabies, which everywhere produces the most intense itching, especially at night, and when near a fire. On the arms numerous hemorrhagic points and deep grooves, in connection with the vesicles, have been produced by scratching. There are similar appearances on the abdomen. The hands and arms were ordered to be smeared with lard twice daily, and enveloped in oil-silk. In six days the eruption had disappeared from these parts. On the abdomen, however, it still continued, and the lard was then ordered to be also applied there. Here it could not be covered with oil-silk, and the surface was continually dry. Still great amelioration was produced, and he was discharged cured, November 28th.

Case IV.—There is at this moment in the clinical ward, a lad named John Harley, aged 17, a labourer's son, affected with intense emphysema and bronchitis, of which diseases it is unnecessary now to speak. On admission (December 3, 1849), the hands, flexor-surface of the arms, and abdomen, were, as you saw, closely covered with vesicular scabies, which induced great itching and scratching, and, as a result of the latter, grooves and bloody marks of the nails. On the 4th, the hands were smeared with lard, and enveloped in oil-silk, as in the former cases. On the 8th of December the eruption on the hands and wrists was completely cured, but still continued in all its intensity on the arms and abdomen, clearly showing the curative power of the remedy. The lard was now ordered to be applied to the arms, and these to be enveloped in oil-silk to keep them moist. On the 15th, the arms were freed from the eruption. Lard was now ordered to be rubbed three times a day on the abdomen.

It is well known that scabies may be cured by numerous local applications, although experience has generally decided that sulphur-ointment is the one which is most certain and rapid in its action. The cases above detailed, with several others which might have been cited, have satisfied

me that the efficacy of the ointment is altogether dependent on the unctuous matter, and that the sulphur has little to do with its therapeutic effects. It appears to me important, however, that the parts should be kept moist, and that the use of oil-silk for this purpose, greatly facilitates the cure. The action of fat seems to render pustules and vesicles abortive, both disappearing in a few days, leaving the skin they covered slightly reddened, with the shrivelled walls of the pustule and vesicle more or less adherent to it.—*Monthly Journal, January*, 1850, *p.* 61.

118.—*On an Apparatus for Fumigating the Scalp, in some Chronic Diseases of that Region.* By Dr. T. Burgess.—[In a recent work on 'Diseases of the Skin of the Exposed Surfaces', Dr. Burgess has recommended fumigation of the scalp in certain of its diseases. He thus describes the apparatus he uses for that purpose:]

The vapour apparatus is extremely simple. It consists of a tin jar, about ten inches by four, with a conducting tube, on which is placed a stop-cock, for the purpose of diluting the vapour, or turning it off, and an elastic cap of vulcanized India-rubber, which fits closely to the head, so as to prevent the vapour from escaping. The great majority of diseases of the skin are constitutional, and those of the scalp are not an exception to the rule. Yet every practitioner is familiar with the difficulty of removing the latter by the unaided influence of constitutional treatment.

Favus, (the *porrigo favosa* of Willan,) for example, which is one of the most unsightly, as well as the most inveterate of the eruptions of that region, may be temporarily relieved by tonics and fomentations, and the skin even made to appear clean and healthy; but the *virus* still remains, and, consequently, the "cure" will be but of short duration. In this, as in other inveterate diseases of the scalp, of constitutional origin, the skin, from the force of habit, adapts itself to the morbid condition, which it retains, with singular tenacity, against all the usual methods of treatment.

In all these cases, the application of vapour, simple or medicated, as the case may require, to the diseased scalp, will be found a very efficient remedy. Where the object is, to *alter the vitality of the parts*, it can be done more effectually by the repeated application of stimulating vapour (the skin being previously cleansed with any detergent wash) than by the employment of caustic lotions or ointments. Indeed, greasy applications of every kind may be advantageously dispensed with in the treatment of diseases of the scalp.

That variety of baldness, which is the result of atony, or disordered nutrition of the hair-follicles and bulbs, will be materially benefitted by the use of the vapour apparatus.—*Med. Times, Feb.* 16, 1850, *p.* 128.

119.—*On Dressing Wounds and Ulcers with Charcoal.* By Dr. Newmann.—In 1846 Dr. Newmann recommended the employment of charcoal as a substitute for charpie, plasters, ointments, &c.; and since that time numerous cases ("thousands" in all, he says) have confirmed

him in the conclusion that the great majority of open surfaces are far more rapidly healed by this means than by any other.

One great object of applications of any sort is the exclusion of the atmospheric air, which coming in contact with the pus decomposes it. The capillary action which takes place between the granules of the charcoal prevents a great accumulation of the pus on the surface of the wound, and spreads it widely, so that it dries and fills up the interstices of the powder, and prevents the access of air to the wounded surface. Charpie and lint also exert capillary action, but not to the same extent, as they cannot penetrate so closely among the irregularities and depressions of the wound. Besides this effect, due to its porosity, charcoal exerts a most favourable influence by its power over putrefaction, and hence its great use in gangrenous wounds, and in fact in all open surfaces when changes in the pus are to be feared. In corroboration of this general eulogium, the author selects certain special cases, which usually offer some difficulty in their management.

Thus every one knows what a troublesome affection is produced by an *ingrowing nail*, and the painful character of the remedies employed; Dr. Newmann declares he is enabled to heal the obstinate ulcer thus produced in as many days as these various means require months. Having separated the soft parts from the nail, so as to expose the ulcer in its entire depth, he deposits the charcoal freely therein, having combined with it a little acetate of lead, or oxide of zinc, leaving the entire nail covered with this, and binding a piece of lint over it, the patient wearing a wide shoe and keeping quiet. In twenty-four hours the toe is bathed in tepid water, and new charcoal is added to the wound, without disturbing any of that previously applied, which may be firmly adherent. A week or a fortnight of such treatment suffices to heal the wound. *Sore nipples* constitute one of the minor ailments that cause great suffering and trouble in healing. In this case he usually employs lycopodium mixed with a little oxide of zinc (for a fine powder, not charcoal alone, though usually the most preferable one, constitutes the basis of treatment), with which the part is well powdered each time the child has sucked. This penetrates into the fissures of the nipple, and however strongly the child may suck, some of it remains in contact. The wound quickly heals. *Discharges from the ear*, dependent upon ulceration of the meatus, are healed by charcoal in three or four weeks, even if the ulcerations were considerable. The meatus is syringed out every day, and the charcoal then freely introduced. *Fissure of the rectum* is one of the most painful and distressing diseases that come under the cognizance of the surgeon. The charcoal should be applied after every stool, and often in the day besides, care being taken to have it effectually and freely brought into contact with the fissured surface. Dr. Newmann, after expatiating upon the difficulty of treating the suppurating wounds intervening on *extensive burns*, so as to prevent deforming cicatrices, declares that charcoal obviates much of the inconvenience, by keeping the surface of the wound dry, even when the suppuration is abundant; and that contraction does not follow, or it is much less considerable than after any other mode of treatment. If the burn is on the back, the charcoal may be freely strewed over the bed. Since he has employed the same

means in *gun-shot wounds*, he has met with much less trismus and tetanus, and has been surprised at the rapidity of the cure. In the treatment of *ulcers of the legs*, even without insisting upon the recumbent posture, he has also been very successful. In a few days the surface becomes cleaned, and a good crop of granulations developed, while the callous edges are levelled. To diminish the circumference of the sore more rapidly, strips of adhesive plaster are now applied above and below it, and across its middle, the intervals between the strips being strewed with charcoal, covered with ointment spread on lint, and bandaged. This dressing is renewed every two or three days. In this way ulcers, which have continued open for years, have been healed in six or eight weeks, the patient still taking moderate exercise.

The cheapness of the substance, and the ease with which it may be prepared, under a variety of circumstances when ordinary dressings are not obtainable, should recommend it strongly, Dr. Newmann observes, to hospital and military authorities. ('Casper's Wochenschrift.')—*Brit. and For. Review, April* 1850, *p.* 546.

120.—*On the Treatment of Nævus.* By Drs. KEBER and LENOIR.—Dr. Keber reports upon the great advantage he has found in employing the *strong nitric acid.* The stronger the acid, the less pain does it excite, and the quicker is the recovery. He takes up a drop of the fuming acid with a glass rod, touches the nævus with it, and allows it to dry on. If a small drop be applied at the earliest stage of the nævus, when it does not exceed a pin's head in size, then not even a scar is left; but when the nævus has arrived at a considerable age, the skin around is inflamed by the acid, suppuration is set up, and a cicatrix remains.

M. Lenoir, of the Hôpital Necker, has for some time past treated nævi with great success by means of the *actual cautery*,—a means especially applicable when the tumour is so placed as to be attacked with difficulty by the scalpel or ligature. He employs a flat platinum needle, heated to whiteness, and along which a copper globe of an inch in diameter slides at will, for the purpose of retaining a supply of caloric in the blade. He was formerly in the habit of piercing the tumour several times with the needle; but finding this in some cases induce an excess of inflammation, he has since only transversed it once, the cure being thus more slowly accomplished, but at less risk. If at a future period the diminution is not considered satisfactory, recourse may be again had to the needle. After the operation, cold-water dressing or other simple means are employed. ('Medicinische Zeitung', and 'Gazette des Hôpitaux.') —*Brit. and For. Medico-Chirurg. Review, Jan.* 1850, p. 259.

121.—*On the Prevention of Pitting from Small-pox, by Means of Mercurial Ointment.* By Prof. BENNETT, Edinburgh.—[Dr. Bennett gives the two following cases, in which the ung. hydrarg. thickened with starch, as recommended by M. Briquet and others, of Paris, was used with the greatest success. The first patient, a female, 27 years of age, was admitted on the 16th September:]

On the 15th, there appeared, on the forehead and face, a papular eruption, which, on the day of admission, had extended itself to the arms, wrists, trunk, and thighs. On examination, I found the eruption partly vesicular on the face, though still papular on the other parts of the body. She complained of sore throat, and difficulty of deglutition. The tongue and throat were red and swollen, scattered over with bright red points, some of which were already vesicular. The pulse was 90, and strong; tongue furred, but moist; the bowels confined; the urine scanty, with a slight lateritious sediment. She was ordered a *purgative powder; a saline mixture; an astringent gargle; and the following ointment:*—℞. Ung. hydrargyri, ℥j—pulv. amyli, ʒij M., *to be smeared over the face night and morning.* The disease went through its usual course, the eruption was confluent on the neck, arms, and trunk, but discrete on the inferior extremities. The secondary fever was rather severe, but she was discharged cured, November 4.

The ointment formed a thick hard crust, which, as it cracked and peeled off, was renewed by a fresh application. It was observable that she never complained of the face; there was no swelling of the eyelids, and when the whole was allowed gradually to separate from the skin, which was accomplished on the 14th of October, it was perfectly smooth, and of its natural colour.

[The second patient was also a female, 19 years of age, and was admitted on the 27th of November. The eruption had appeared on the face on the 25th, and on the 29th the face, mouth, and throat, were covered with thickly-set vesicles. On this day]

The mercurial ointment, thickened with starch, was ordered, as in the last case, to be applied to the face—an astringent gargle—Lemonade for drink. By the 5th of December maturation was complete over the whole body, and mucous membrane of mouth and throat. The pustules, in many places, extensively confluent. The pain, however, was diminished, but the bronchitis and sore throat continued; no pain of face or swelling of eyelids, she picks off the plaster from around the mouth. On the 7th, there was some return of the fever; no inconvenience felt in the face; thick scabs adhere to upper extremities and trunk; slight diarrhœa. December 12.—No fever; diarrhœa ceased; appetite returned; a most offensive odour emitted by the body; the scabs have separated from the neck and upper extremities, but are still adherent to trunk and inferior extremities. An abscess formed over the whole surface of each foot below the epidermis. *Soles of feet to be kept moist with tepid water.* December 17th.—The mercurial plaster is now separated from the face, the surface of which is quite smooth. The arms and shoulders are deeply indented with pits, where the scales have separated. The cuticle over the soles of the feet is separating, and a purulent discharge flows from the surface. December 21st.—This woman is now convalescent. There are no pits on the face, except round the mouth and that portion of the forehead in contact with the hair, which was not covered by the plaster.—*Monthly Journal, January*, 1850, *p.* 60.

122.—*On the Use of Tincture of Capsicum for Chilblains and for Toothache.* By Dr. A. TURNBULL.—My plan of treatment is simply to saturate a piece of sponge or flannel with the concentrated tincture of capsicum, and to rub well over the seat of the chilblains, until such times as a strong tingling and electrical (?) feeling is produced.

This medicine possesses an extraordinary power in removing congestion by its action upon the nerves and circulation.

This application ought to be continued daily until the disease is removed: relief will be experienced on the very first application, and frequently there will be a total removal of the disease after the second or third. This of course depends upon the severity of the case. This embrocation when rubbed never produces excoriation, if the skin is not broken.

The manner of using it for toothache is by putting a drop or two of the tincture on cotton, and applying it to the part affected, the relief will be immediate. The following is the formula:—Tinctura capsici concentrata. ℞. Capsici baccarum, ℥iv.; spiritus vini rect. ℥xij. Macera per dies septem et cola.

(It may also be made with advantage by displacement.) —*Med. Gazette, Jan.* 25, 1850, *p.* 167.

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123. — *Operation for Contraction from Burn.* Performed by W. FERGUSSON, Esq., Surgeon to King's College Hospital.—[The object of this operation was]

To take a preliminary step for the removal of the deformity resulting from a burn. The patient, a little girl eight or nine years old, presented, in the right axilla, a cicatrix, forming a kind of web across the arm-pit, which is drawing down the limb towards the chest. This strong web, and various cicatrices about the arm itself, entirely prevent the raising of the limb towards the head, the girl being just able to bring it to a right angle with the trunk. The limb is comparatively useless, owing to this state of things, and it is, of course, of great importance to the child, that this deformity should be remedied. Mr. Fergusson stated, that from the various methods which have been advocated to remove such contractions, he would make choice of one which held out great hopes of radically doing away with the abnormal connexions. It would, indeed, be an easy matter, whilst the patient held out her arm, to divide the band transversely, but by this, the contractions are apt to recur, and parts often return to the same conditions in which they were before. For instance: in congenital union of fingers, the latter will often grow together again when the contracted parts have been freely divided, and the knife does not prevent an ultimate contraction. It has, however, lately been proposed, that a callus should be excited at the upper part of the band, and that the latter should be divided only when the superior portion is sufficiently hardened to preclude the possibility of its taking on adhesive action. Mr. Fergusson, after having given this explanation, thrust a curved needle, armed with a skein of silk thread, through the base of the above-mentioned web, very close to apex of the cone formed

by the axilla; this seton is expected to excite a sufficient inflammation and subsequent induration in the part, and, when this has taken place, the band may with safety be divided. Mr. Fergusson mentioned, that this process is rather tedious, and that it would be much more expeditious to cut at once through the contracted parts, but the benefits resulting from the course he had adopted were well worth the time necessary for the different steps of this method of remedying deformities from burns. Mr. Fergusson had lately a message from Chelius, the celebrated surgeon of Heidelberg, concerning this mode of operating; and continental surgeons are in the habit of thus endeavouring to forestall fresh contractions, when those resulting from burns have been divided.—*Lancet, Feb.* 16, 1850, *p.* 217.

SYPHILITIC DISEASES.

124.—ON THE GENERAL TREATMENT OF SYPHILIS.

By Bransby B. Cooper, Esq., F.R.S., Lecturer on Surgery at Guy's Hospital.

[Mr. Cooper remarks that the difficulties in the treatment of syphilis arise chiefly from the peculiarities in the constitutions of patients; and that therefore it is impossible to lay down any general rule, further than that mercury is to be administered, modified and combined with the other remedies appropriate to the case. He says:]

In primary syphilitic sores, if they be only of three or four days standing, I at once apply concentrated nitric acid, which has always proved sufficient to destroy the virus, and I have in no instance known secondary symptoms to follow this treatment. If the sores be of longer standing, and, both from the history of the case and their appearance, there be just reason to suspect a syphilitic origin, I at once commence with blue pill night and morning, abstaining, as I have already mentioned, from any local application, taking the appearance of the sore as the indication of the effect of the mercury upon the constitution: again, in sores which, from their appearance and the history of the case, are of doubtful character, I employ constitutional and local means, as indicated by the peculiar temperament and diathesis of the patient, as well as by the conditions of the sore itself. In such cases I prescribe iodide of potassium, bark, with nitro-muriatic acid, sarsaparilla, and similar remedies, applying merely warm water dressing to the sore; and if such means do not prove effectual, I then resort to small alternate doses of mercury, placing the patient at the same time under strict dietetic discipline.

With all these precautions, however, it sometimes happens, that, although the primary sores may yield to the treatment adopted, secondary symptoms will result; in my own experience I should say that this untoward event occurs either in consequence of the mercury having been discontinued before the induration of the sore had entirely disappeared, or from some peculiarity in the constitution which prevented the specific

effect of the mercury upon the disease. There is sufficient reason to suspect the existence of this latter condition when the virulent ulcer remains unchanged in its appearance after mercury has been exhibited for the period usually sufficient to produce its effects; and at the same time, when no ptyalism is present in these cases, I leave off the use of mercury internally, and make the patient rub in mercurial ointment, which rarely fails to produce the desired effect; but even in this case the mercury must be continued until all induration of the sore has vanished.

Secondary symptoms.—If we fail from any cause in eradicating the specific virus of a primary sore, although at the same time we may have succeeded in producing its cicatrization, constitutional symptoms supervene, and what are termed "secondary symptoms" are established: these may be the result of primary chancre in the individual affected, or they may be hereditarily communicated from the mother to the infant, although it may also happen that the infant might be at birth inoculated by a chancre in the vagina of the mother, and secondary symptoms ultimately result from that contamination.

Secondary symptoms, when they take place from uncured primary affections, in consequence of the admixture of the virus with the blood, do not, as Hunter has said, seem to produce a general constitutional effect, for during the influence of the poison every vital function seems to be perfectly performed; but owing to the susceptibility of certain parts to be affected by the venereal poison, a train of local symptoms present themselves: thus, the mucous membrane of the throat and tonsils, the skin, mucous membrane of the mouth and nose, and the iris, seem to be successively affected. It has been said that there is a second order of parts liable to be consecutively affected,—as the periosteum and fibrous tissues generally, even the bones themselves,—but I am inclined to believe that such affections depend upon the action of mercury in peculiar constitutions, especially in those of a rheumatic or gouty diathesis. Under ordinary circumstances the parts which seem especially prone to be affected by this form of syphilitic disease are mucous membranes and skin; and, as far as I have seen, the sore-throat generally precedes the cutaneous eruptions. From about six weeks to two months, and even sometimes longer, after the primary symptoms appear to have been cured, the patient generally begins to complain of an uneasy sensation in swallowing, attended with more or less dryness about the fauces. Upon examination an erythematous blush will be seen extending over the mucous membrane of the soft palate and tonsils, but which can scarcely be distinguished from the inflammation concomitant with simple sore-throat; unless, perhaps, it may be said that the mucous membrane has somewhat the appearance of being raised from its adjacent tissues, and that it is less vivid in colour than in common inflammation, and this is unattended by enlargement of the tonsils themselves.

When I see these symptoms I at once examine the cicatrix of the primary sore, and also the chest and abdomen, to ascertain if there be any venereal blotches: if I find any thing approaching to an abnormal induration in the cicatrix, I order mercury, and if the patient had taken it internally before, I usually direct him to rub in mercurial ointment, taking it for granted that the secondary symptoms indicate the failure of the mercury, before taken internally, in destroying the specific syphilitic

poison; but if there be no such induration of the cicatrix nor venereal blotches, and if I learn from the history given by the patient that there was reason to believe that the mercurial course had been judiciously attended to, I prescribe the following mixture:— ℞. Iodini, gr. ss.; potass. iodid. ʒss.; papav. syrup. ℥ss.; inf. gentian. co. ℥viij. M. capiat cochl. larga, ij. bis quotid.

Should I have any doubt of the accuracy of the patient's account of his case, I prescribe, in addition to the above mixture, three grains of Plummer's pill at bed time.

If the erythematous blush still continue, it will soon begin to ulcerate, generally beginning on one of the tonsils, and sometimes in the velum palati or uvula: in such cases I first prescribe the mixture as above, and if the sores then heal, but if the patient be of delicate constitution, I give him bark, with nitro-muriatic acid, to improve his general condition; and should the symptoms of sore throat again return, I order Donovan's solution, as follows:—℞. Sol. iodid. hydrarg. et arsenici, ♏v.; sarsæ ext. gr. x.; sarsæ decoct. co. ℥jss. M. ft. haustus bis quotid. sumendus.

This remedy I have found of the greatest use, and in these cases it far surpasses, in my opinion, the iodide of potassium, which seems to suspend the diseased action for the time rather than to remove it from the system.

The erythematous syphilitic condition of the throat, which I have just described, sometimes passes into a chronic form, and then seems especially to attack the mucous membrane covering the middle constrictor of the pharynx: the true erythematous blush can scarcely be recognized, but the membrane puts on a streaky white appearance, and the patient complains more of an uneasy dryness of the throat than of pain in swallowing: if this condition be not removed, cutaneous eruptions are almost sure to follow. I give, therefore, Donovan's solution in these cases, and not unfrequently paint (with a camel-hair brush), the affected mucous surface, with the solution of nitrate of silver.

I have sometimes known patients thus affected become quite deaf without any enlargement of the tonsils, which leads me to believe that the inflammation sometimes extends along the eustachian tube. In some few cases I have found it extremely difficult to cure ulcerations of the throat resulting from secondary symptoms; and in these, the remedies I have described seem almost inefficient. This occurs more especially when ulceration extends to the mucous membrane of the larynx, and probably the difficulty arises from the continuous motion of that organ, which interrupts nature's efforts at reparation. I have found the fumes of the red oxide of mercury, inhaled by means of an appropriate apparatus, very effective in these cases; and I believe, should this not have the desired effect, nothing is left to be done but to perform the operation of tracheotomy, with the object of placing the inflamed and ulcerated mucous membrane in a condition in which it can remain in a perfect state of rest; as unless the ulceration is checked, the death of the patient must inevitably take place.

I acknowledge that I have never myself performed the operation of tracheotomy with this view, but I once advised its adoption in the case of a gentleman at Woolwich: he would not, however, consent to its being performed, and died six weeks after from the continued progress of the disease.—*Med. Gazette, Jan.* 11, 1850, *p.* 46.

125.—ON THE PATHOLOGY AND TREATMENT OF CHANCRE.

By Bransby B. Cooper, Esq., F.R.S.

In my own practice I have come to something like the belief that induration, approaching to cartilaginous hardness at the base of a sore, is almost always the indication of its virulent nature, and demands, therefore, the specific action of mercury for its cure, or secondary symptoms will be certain to supervene. If the patient should present himself to the surgeon within three or four days after the sore has appeared, I agree with Ricord in the belief that the application of nitric acid will entirely destroy the virus, and that the sore will heal and not leave the patient subject to secondary symptoms. I have in several cases followed this practice, and without the occurrence of secondary symptoms in a single instance. I should, however, never recommend the adoption of this plan when the base of the sore has become indurated. The success of this "abortive treatment", as it is termed by Ricord, proves that a period exists in which the action of venereal contagion after infection is entirely local. Some authors speak of this as the period of incubation, but I can scarcely comprehend what is here meant by incubation. Pus cannot be formed instantaneously: there must be premonitory symptoms. So also in the development of disease from the action of a virus; and, therefore, it must be considered that at first there is merely a local action, perhaps merely simple irritation; and secondly, the specific action is generated. It is during the first epoch that means may be employed to destroy the virus before the constitution is affected, the hardness of the sore being, in my opinion, an indication of the constitutional specific action having commenced.

As may be inferred from what I have already said, syphilis may not only be propagated by sexual intercourse, but also by inoculation, which may take place by accident; for example, a lancet may be employed in bleeding a patient after having been used to open a virulent bubo; and again, infants are not unfrequently inoculated with the primary disease during their birth, from the presence of a chancre in the vagina of the mother. The period which elapses between the time of infection and that at which the disorder becomes manifest, varies from seven to ten days, but is sometimes considerably longer. The first local symptom is an inflammed reddish spot on the part infected. From this inflamed patch a vesicle arises, containing a small quantity of fluid. When the vesicle bursts ulceration is set up, and the part begins to thicken and to be elevated above the surrounding structures, the thickening being generally circumscribed, having an indurated base and prominent edges. The ulcer sometimes continues to extend itself, and assumes a phagedenic character. It may also acquire a hard everted edge. The usual form of a chancre is more or less circular, but this characteristic depends in great measure upon the situation of the sore, and the firmness of the attachment of the mucous membrane to the subjacent tissues. Hence a chancre extending from the glans to the mucous membrane of the prepuce exhibits great irregularity of form,

in consequence of the unequal attachment of the mucous membrane to the interior of the prepuce and the surface of the glans.

Another great source of irregularity in the form of the chancre is the extension of the ulcerative process from one ulcer to another, uniting them into one irregular sore. The depth of a chancre is greater when the sore is situated on the prepuce than when on the glans, which latter structure seems to have a great power to modify the appearance of the sore, and from its higher degree of vitality seems to resist the progress of the ulceration into its structure, and the sore therefore extends itself chiefly superficially. The surface of a chancre usually assumes a greyish appearance, looking as if besmeared with a secretion of that colour, having a degree of tenacity as if composed of semi-organized matter, and somewhat resembling the kind of secretion seen on cancerous sores. An eschar often covers a chancre, particularly if it be exposed to the action of the air; and from under this crust matter not unfrequently exudes; this matter is usually virulent. An areola of inflammation surrounds the sore, terminating usually by that hardness which constitutes the base; and the colour of the areola depends much upon the constitution of the patient. The edges of the chancre are generally everted, and, as I have before said, become indurated like the base. All these physical peculiarities, if present, would render the diagnosis of true syphilis sufficiently evident; but as the sores present all the various modifications already described, owing to differing constitutional conditions, it is but rarely that they present themselves in such a form as to enable the surgeon to arrive at once at a correct opinion. This involves a question, whether it be right to submit a patient to the ordeal recommended by Ricord, viz., inoculation? In my own practice I have frequently found great difficulty, when employing his method, in healing the factitious sore; and I am inclined to believe that even the constitutional symptoms are aggravated by thus adding a fresh taint through the medium of inoculation. I know that Ricord is of opinion that the quantity of matter introduced is of no importance as to the effect upon the constitution; in this respect I must, however, maintain an opposite opinion, which is, indeed, founded upon my own experience and observation of the disease.

Primary syphilitic sores in women are formed on the labia and nymphæ, just as they are upon the glans penis in man; and they go on to ulceration in exactly the same manner. Chancres are also often formed on the perineum, and even on the verge of the anus, in the female; for the purulent matter may run down from the genitals, and, excoriating the parts, produce ulcers upon them.

If a patient applies to me with a venereal sore which had only made its appearance three or four days before, I at once apply concentrated nitric acid, for the purpose of destroying the virus before it has affected the constitution; nor have I hitherto known a single case so treated in which secondary symptoms supervened. Some surgeons always recommend local means for the cure of a chancre, at whatever period it may be presented to the view, arguing, that if secondary symptoms do supervene, they are as readily cured as the primary. It is also considered by many that secondary symptoms may be cured without the use of

mercury. I cannot say that I hold to either of these opinions, but believe firmly, that if secondary symptoms result, either from failure in the action of the applied cautery, whatever that may be, or from the unsuccessful issue of any other plan of treatment, that nothing but mercury can be relied upon as a true specific; but the mode of its exhibition, and quantity administered, must of course depend upon the state of the constitution of the patient. The plan of treatment which I adopt, I vary according to the appearance of the sore: if it exhibits all the indications I have described as the signs of a true chancre, I begin by treating the patient constitutionally. I give five grains of blue pill and a quarter of a grain of opium every night and morning, without applying any local remedy whatever. My reason for this is, that I consider the appearance of the chancre the best indication of the effect the medicines produce. Some years ago it was very much the practice to severely salivate syphilitic patients; but I may say that this custom among surgeons has now passed away, and mercury is seldom given in greater quantity than is sufficient to slightly affect the gums and salivary apparatus. The quantity of mercury required varies, moreover, in every case, as different constitutions are so variously affected by this medicine.

It appears to me much better to allow the chancre to remain without local treatment during the time the patient remains under the influence of the mercury; for as the surface of the sore is covered with a peculiar brownish matter, and it goes on gradually extending, and eating its way deeper and deeper into the structure in which it is formed, if black wash or nitrate of silver be applied, the chancre loses at once its specific appearance, and consequently we are deprived of a valuable guide by which we may estimate the amount of constitutional effect produced by the mercury. I have long followed this plan of treatment, and with sufficient success to confirm me in my adherence to it.—*Med. Gazette, Dec.* 21, 1849, *p.* 1046.

126.—*On Irritable Chancre.* By Bransby B. Cooper, Esq.—This form of syphilitic sore is indicated by great sensitiveness to the touch, tendency to bleed, and by glassy and exuberant granulations, the whole sore being surrounded by an inflamed areola. Opium is the best remedy to be employed in these cases, but it must be given in repeated doses: at the same time, the nitrate of silver should be applied to the surface of the sore. If, after this treatment, the irritability be subdued, but the peculiar induration of a syphilitic sore still remain, mercury must be administered, in the same manner as in a case in which the irritable condition had never existed. In some instances of irritable chancre, where I have combined calomel with the opium, for the purpose of preventing the constipating effect of the narcotic, I have found this combination not only equally efficacious with the opium alone in curing the irritability, but at the same time it cures the syphilitic character of the sore, and have even found its continuance, after the irritable symptoms had been relieved, sufficient to complete the removal of the syphilitic character also. This plan cannot, however, always be adopted, as certain constitutions are so extremely susceptible to the purgative influence of calomel. - *Med. Gazette, Jan.* 11, 1850, *p.* 45.

127.—*On Phagedenic Chancre.* By Bransby B. Cooper, Esq.—This is closely related to the kind of chancre I have just described; but, instead of being characterised by extreme sensitiveness of surface, it is marked by the rapidity with which it ulcerates; so that the increase of the sore surface is the source of action in such cases. Having first well opened the bowels, to make sure that there is no accumulation of fæces in the intestinal canal, repeated doses of opium are to be given, and soothing fomentations applied to the sore. Should the vital powers of the patient be depressed, bark, ammonia, and even a little wine may be safely and judiciously prescribed; but if, on the contrary, the condition of the sore is at all referable to a plethoric state of the system, antiphlogistic means must be adopted; and, should not such constitutional treatment prove effective in checking the progress of the ulceration, I am in the habit of applying concentrated nitric acid, which I have rarely found to fail in these cases. I lately attended a case with Mr. Parrot, jun., of Clapham, who had carried the use of sedatives and tonics to the fullest extent, paying due attention at the same time to the state of the bowels, without being able, however, to check the progress of the disease. One application of nitric acid by the point of a glass rod proved sufficient to check the ulceration; and, under the subsequent exhibition of mercury, the patient recovered.—*Med. Gazette, Jan.* 11, 1850, *p.* 45.

128.—*On Gangrenous Chancre.* By Bransby B. Cooper, Esq.—This form of chancre is to be treated much in the same manner as any other gangrenous sore, depending as it does more frequently upon constitutional than upon local causes. The first object should be to secure the free evacuation of the bowels: stimulating poultices should be applied immediately on the sore, such as black wash, nitric acid lotion, or stale beer grounds, the patient being kept in the recumbent posture. Ammonia, bark, or serpentary, with wine or porter, are usually indicated; although in some few cases I have met with gangrenous chancres in persons with such a temperament as to preclude the propriety of the exhibition of stimuli, and which have, indeed, required sudorifics and opiates, uncombined with the latter class of medicines.—*Med. Gazette, Jan.* 11, 1850, *p.* 45.

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129. —*On Bubo.* By Bransby B. Cooper, Esq.—[Mr. Cooper lays especial stress upon the importance of distinguishing between a bubo arising from a virulent and one from a non-virulent disease. He says:]

Non-virulent bubo is that which attends simple gonorrhœa, and may be considered as arising from common inflammatory action, extending in the course of the absorbent vessels of the penis to the glands of the groin; this disorder is to be treated as phlegmonous swellings in other parts of the body, either by repellants for the purpose of preventing the formation of matter, or by fomentations or poultices to produce suppuration, when that termination seems to be threatened by nature. By

repellant remedies, I mean those which have a tendency to repress the formation of matter, such as leeches and evaporating lotions: by means of these we may succeed in preventing suppuration, but there sometimes yet remains a permanent indurated condition of the swelling, which may excite apprehension in the mind of the surgeon as to its having been produced by a specific virus, a chancre existing within the urethra. A bubo of this kind may, however, result from a mere strumous habit; and if so, the hardness readily yields to the exhibition of iodine and iodide of potassium, and such dietetic rules as generally improve strumous constitutions; while, on the contrary, if the hardness depends upon the action of a specific poison, a mercurial course is, in my opinion, the only safe mode of treatment.

A *virulent bubo* is marked by the same characteristic induration as a chancre itself, and the presence of this induration must inevitably give rise to the question of the virulent or non-virulent nature of the disease. The mere phlegmonous bubo has always a tendency to suppurate; while the virulent bubo, on the contrary, seldom manifests this disposition; and, therefore, its permanent hardness, uncombined with any symptom of suppuration, is a further proof of a virus having been the origin of a bubo. The virulent bubo goes on to ulceration; but even this is not conclusive, for strumous ulceration not unfrequently occurs in persons of a scrofulous diathesis; therefore, as Ricord observes, there is as much difficulty in forming a diagnosis between the virulent and non-virulent bubo as between the virulent and non-virulent sore; and he maintains that by inoculation, and by that test alone, can a certain conclusion be arrived at.

The same objections arise here as I have before described when speaking of doubtful sore—viz., the difficulty of healing the factitious sore; nor, indeed, does it always occur, as Ricord himself acknowledges, that the sore produced by a virus invariably puts on the decided character of a virulent ulcer; so that, indeed, the same difficulties may still result in forming a just diagnosis as existed before the experiment was tried.

In my own practice, therefore, when the bubo puts on all the characters of a virulent or specific action, I commence at once with the cautious administration of mercury, not unfrequently combining with it small doses of iodide of potassium, abstaining at the same time from the use of any local application to the ulcerated bubo, which might tend to conceal the characteristic appearances of the sore. If the mercury be producing the desired effect, the ulcerated surface of the swelling acquires a healthy appearance, indicated by the growth of soft red granulations, by the absence of any tendency to eversion of the edges of the sore, and by a general softness of the whole base of the tumour; indeed, the characteristics of the healing sore are as strongly marked as were the peculiarities which had before indicated its virulence. The mercury should be continued as perseveringly, until all induration has disappeared, as in the cure of a primary chancre, or secondary symptoms will be sure to supervene.—*Med. Gazette, Jan.* 11, 1850, *p.* 46.

130.—*On Venereal Warts and Condylomata.* By Bransby B. Cooper, Esq.—In long-standing cases of gonorrhœa you will sometimes observe condylomatous growths about the scrotum, perineum, and verge of the anus: these can generally be cured by an application of the yellow wash. Warts often follow also upon a gonorrhœa, in cases where the disease commences externally—that is to say, in balanitis. In the first instance they are found in points where the mucous membrane has been abraded: warty granulations spring up from these points. Whenever these warts are present with phymosis, the prepuce must be laid open immediately; this is always necessary. Sometimes these warts are very difficult to cure. When they have narrow peduncular necks, a ligature may be used to remove them: in other cases caustic should be applied to them, and savine powder may also be employed as an escharotic. Sometimes, however, neither caustic nor savine powder will remove these warty excrescences: they must then be excised, and caustic applied to the surface from which they are removed.—*Med. Gazette, Dec.* 7, 1849, *p.* 959.

131.—*On Gonorrhœa.* By Bransby B. Cooper, Esq.—Whatever may be the cause of a gonorrhœa, it is impossible to distinguish between that produced by sexual intercourse and that having some other origin; and whatever may be the opinion entertained as to the identity or otherwise of this affection with syphilis, one thing is certain, it is a disease of a highly inflammatory nature: this would seem to regulate in great measure the system of treatment to be adopted for its cure. The means of treatment are of two kinds, internal remedies and topical applications: in the acute stage antiphlogistic measures must be adopted; and in the army, where we had a tolerable amount of practice in this way, we used to cure almost all our cases in ten or twelve days. The system we always adopted was to put the patient to bed, and give tartar emetic, so as to keep him in a constant state of nausea; the discharge, which was thick and pus-like, then became thin, and the chordee and priapism, which were so distressing to the patient, ceased almost immediately; in some cases leeches were applied to the perineum; occasionally blood was taken from the arm; and, having subdued the inflammatory symptoms, as an internal remedy we gave the balsam of copaiba. In private practice we cannot, however, get patients to submit to quite such stringent measures; but at the same time I think you should always be somewhat active in your antiphlogistic treatment. After giving purgatives and nauseating doses of tartarized antimony to subdue the inflammation, I have found the following mixture very efficacious:—℞. Balsam copaiba, ℥ss.; pulv. cubebæ, ℥ss; liq. potass. ℥jss.; mucilag. gum. acaciæ, ℥ss.; aquæ destillatæ, ℥vijss. M. ℥j. bis in die sumenda. This mixture should never be taken upon an empty stomach: about eleven and three o'clock, are, I think, the best times; the mixture alone will remove all the violent symptoms, and stop the discharge, but unless previous lowering treatment has been adopted, the discharge will return; if, however, purgatives and tartar emetic have been given beforehand, the above mixture will almost always effect the cure. My own practice is to give the mixture first, to alleviate the

distressing symptoms; I then employ antiphlogistic treatment, and afterwards recur to the mixture to complete the cure.—*Med. Gazette, Nov.* 23, 1849, *p.* 871.

132.—*On the Use of Injections in Gonorrhœa.* By BRANSBY B. COOPER, Esq.—Sedative injections will probably always be of service when the inflammation is considerable, as they almost immediately give relief to the pain. Liquor plumbi diacetatis, ℳxx.; and water, ℥jss., is a very good sedative injection. When thrown into the urethra it should be kept in for some time by compressing the end of the penis. When the inflammation is very severe, emollient injections may also be useful, as they impart to the internal surface of the urethra a protective coating against the irritative effect of the urine. Irritating injections must not be employed where there is much inflammation, particularly when there is any constitutional tendency to irritability, nor when the inflammation has extended to the testicles or bladder, which is known by the tenderness of the parts, and a constant inclination to make water: they should also be avoided when there is a probability that the perineum will suppurate. Irritative injections often produce a good effect in constitutions that are not very irritable, and where the disease appears under a mild form. A grain of bichloride of mercury, in eight ounces of distilled water, is a good injection of this kind: its strength may be somewhat increased as the treatment goes on, if it should not at first be found effectual.—*Med. Gazette, Dec.* 7, 1849, *p.* 958.

DISEASES OF THE EYE AND EAR.

133.—NEW INSTRUMENT FOR THE EXAMINATION OF THE EAR.

Mr. HARVEY exhibited an instrument to the Medical Society of London for the purpose of testing the condition of the eustachian passages. The instrument, which was a modification of Kramer's auriscope, had been used in a great number of cases by Mr. Harvey, and the result of that experience had been his conviction that catheterism of the tube was most frequently resorted to where no such necessity existed. The instrument resembled a flexible stethoscope, but the bell-end was sufficiently large to cover the auricle of the patient; the other end of the instrument was tube-shaped, and this being placed in the ear of the surgeon, the condition of the eustachian passage was indicated by the patient taking a forced expiration. If patent, the volume was heard to rush through the tube: if obstructed, no such indication was presented. The advantages of this simple but efficient mode of diagnosis were summed up as follows: First, it prevented the unnecessary use of the eustachian catheter in cases of chronic disease, in which an inflammatory condition of the tube, or other causes, rendered the use of the catheter positively injurious. Secondly, it would show whether enlargement of

the tonsil had really had any influence in the production of deafness—*a* mistake too frequently made, and tending to unnecessary extirpation. In a conversation which followed, several Fellows took part: the question of how far the enlargement of the tonsil acted as an obstruction of the end of the eustachian tube was broached; and while, on the one hand, it was contended that such enlargement did produce occlusion, it was shown, on the other, that the pathological anatomy of these bodies proved the contrary. Reference was also made, in an especial manner, to a great number of facts, which proved that the excision of almost the entire tonsil afforded no relief to the infirmity. In addition to this, cases were cited by some of the Fellows, in which the operation of removal had been followed by very unpleasant and even serious consequences. The more common form of inconvenience was a constant dryness of the fauces, and an enlargement of the mucous follicles of the pharynx. Patients repeatedly complained of the result. The wholesale system of cutting away important organs as an imaginary means of curing disease, was strongly reprobated by several gentlemen present.—*Med. Gazette, Feb.* 8, 1850, *p.* 251.

134.—*On the Use of the Otoscope in the Diagnosis of Diseases of the Ear.* By J. Toynbee, Esq., F.R.S., Surgeon to the St. George's and St. James's Dispensary.—This instrument consists of an elastic tube, eighteen inches long, and about half an inch in diameter, each extremity having attached to it a piece of ivory or ebony. One end of this tube being placed in the external meatus of the patient, the other is inserted in that of the surgeon, and by this means sounds emanating from the tympanic cavity of the patient can be distinctly heard by the medical man.

The sound produced by the passage of air into the tympanic cavity, when the organ of hearing is healthy, consists of a series of very faint cracks, which are distinctly appreciable by the use of the *otoscope.* Mr. Toynbee states it as his opinion that, as a general rule, when the eustachian tubes are open, patients can force air into the tympanic cavity by attempting to make a forcible expiration while the mouth and nostrils are closed. Exceptions to this rule are found in children, and in certain adults, who cannot be taught to make the necessary forcible expiration: in these cases recourse must be had to the eustachian catheter, which being introduced into the eustachian tube, and another tube very light and elastic *(the explorer)* being attached to the nozzle, the medical man can blow through it, and distend the tympanic cavity at the same time that he is listening with the *otoscope* inserted in the meatus externus.—*Med. Gazette, Feb.* 22, 1850, *p.* 333.

135.—*On the Removal of Foreign Bodies from the Meatus Auditorius.* By J. Toynbee, Esq.—[Mr. Toynbee objects to the use of the forceps and curette for the removal of foreign bodies from the meatus auditorius, as he finds that they are extremely liable to cause injury of the meatus, or of the membrana tympani. He says:]

The instrument that I have always found successful in removing

foreign bodies from the external auditory meatus without fear of producing inflammation, is a syringe, of capacity sufficient to hold two or three ounces of water. The plan of using a syringe in these cases has been often recommended, but I feel confident that it will not prove successful unless the syringe be of sufficient size to allow the water to be injected with considerable force. Forceps and other instruments are had recourse to by surgeons who have found that the foreign body is not moved by the use of a small syringe, the great fault of which is that sufficient force cannot be used to cause the water to pass between the foreign substance, when it is large and round, and the walls of the meatus; or if the substance is heavy, an outward current powerful enough to carry it towards the orifice cannot be induced. Of the foreign bodies which I have recently removed from the external auditory meatus by means of the syringe, two consisted of a pea and a bead, both appearing on examination with the speculum to be closely surrounded by the membranous meatus; the third was a piece of slate pencil lying at the lower wall of the inner extremity of the tube, and in contact with the *membrana tympani*. I feel confident that an attempt to extract any of these substances by means of forceps or director would have been attended by injury to the meatus or the *membrana tympani*, whereas each was removed by the use of a syringe for about three minutes.—*Prov. Med. and Surg. Journal, Jan.* 23, 1850, *p.* 52.

136.—*On the Diseases of the Membrana Tympani.* By Joseph Toynbee, Esq.—[There are some diseases, which, according to Mr. Toynbee, implicate only one of the structures which compose the membrana tympani, and others which involve the whole of these structures. Mr. Toynbee observes:]

The external or epidermoid layer of the membrana tympani is found in two diseased states; the first is hypertrophy, in which it becomes many times thicker than natural, and forms a dense laminated mass, which adheres to the outer fibrous layer; the second diseased state is where it is slightly thicker than natural, its surface being studded by numerous small, round masses, and in this state it adheres to the fibrous layer much more firmly than natural. Before referring to the diseased conditions of the fibrous laminæ, it is requisite to observe, that it not only consists of two sets of fibres, the radiating and circular, but these sets of fibres form two distinct layers, easily separated from each other, and subject to diseases wholly independent of each other. Thus it will be often found that the outer or radiating fibrous layer is thicker, whiter, and more dense than natural; while the internal circular, fibrous layer is perfectly healthy; in other cases the internal layer is much thickened, while the outer layer is translucent and healthy. The external surface of the outer layer is frequently the seat of chronic inflammation, when it becomes very thick and vascular, and is covered by granulations of a deep red colour; polypi are also developed from it. Chronic inflammation of the outer layer of the membrana tympani frequently induces ulceration, by which process portions of one, often of both of the fibrous laminæ are destroyed, while the mucous membrane remains entire. In cases where only a small portion of each of the fibrous laminæ has thus

been removed by ulceration, a deep depression exists, caused by the mucous membrane bulging inwards. Where much of the fibrous coats have been destroyed, the mucous membrane falls inwards, towards the ossicula and promontory, and becomes adherent to them. The fibrous layers are also the seat of calcareous deposit. The internal mucous laminæ of the membrana tympani, which in its natural state is so thin that it is frequently difficult to detect its presence, becomes thickened by chronic inflammation, and sometimes is so much hypertrophied, that its inner surface is in contact with the promontory. In acute inflammation, lymph is effused from this mucous layer, and bands of adhesion are formed, which connect it to the ossicula, or to the inner wall of the tympanum. The diseases of the membrana tympani, in which all its component structures are at the same time affected, are the following:—1. Hypertrophy, where the epidermoid, fibrous, and mucous layers are thickened. This not unfrequently proceeds to so great an extent, that the membrana tympani is ten or even twenty times its natural thickness, and it becomes opaque, hard and dense, like a piece of cartilage.—2. Ulceration, where all the layers are destroyed, wholly, or only in one part, so as to cause a perforation.—3. An increase of the external concavity, so that its internal surface is in contact with the promontory with which it is frequently firmly adherent.—4. An absence of the external concavity, in place of which it is perfectly flat.—5. Scrofulous degeneration, in which all the layers lose their natural structure.—6. Calcareous degeneration, in which there is often not a vestige of healthy structure in any of the layers.—7. An increased degree of tenseness; this state is most frequently accompanied by the presence of membranous bands, which connect its inner surface to the promontory stapes, or other parts of the inner wall of the tympanum.—8. Sometimes the whole of both fibrous coats are destroyed by ulceration, and the mucous layer remaining entire, falls inwards, and covers the surface of the promontory, and the inner wall of the tympanum.—9. Sometimes one-half of the membrana tympani is destroyed, and the border of the remaining half becomes adherent to the inner wall of the tympanum, forming a closed cavity.—10. The entire substance of the membrana tympani is sometimes ruptured. The part most subject to rupture is that between the posterior margin and the handle of the malleus.—*Lancet, April* 13, 1850, *p.* 455.

137.—*The Arcus Senilis a Fatty Degeneration*.—At a recent meeting of the Westminster Medical Society, Mr. CANTON displayed some sections of the cornea, under the microscope, taken from a female, aged 82 years, with a view of showing the arcus senilis to be a fatty degeneration of the cornea. In the same subject, (a spare woman, who had died apparently of old age), the heart and arteries were affected with the like atrophy with degeneration, as it has been termed by Professor Paget. Several other specimens made from the corneæ of persons who had passed the age of fifty, showed the deposit between the fibres of the part. Mr. Canton stated that he had not as yet met with the appearance of a corresponding deposit in the edge of the crystalline lens, as had been mentioned by Dr. Schön, of Hamburgh. A clear internal ring of cornea is always to be seen between the edge of the senile zone and the margin of the sclerotic.—*Prov. Journal, March* 20, 1850, *p.* 161.

MIDWIFERY,

AND THE DISEASES OF WOMEN.

138.—ON THE DETECTION AND TREATMENT OF INTRA-UTERINE POLYPI.

By Prof. Simpson, Edinburgh.

[Dr. Simpson commences his interesting paper by quotations from Ramsbotham, Madame Boivin, Dupuytren, and others, to show that the existence of polypi entirely within the uterus and concealed by it, cannot be certainly determined by the symptoms to which they give rise. It has been supposed, he remarks, that this uncertainty was of little practical consequence, since hemorrhage, —the great source of danger in uterine polypi,—was not liable to occur until the polypus had passed the os uteri. But Dr. Simpson saw with Dr. Wood, a few years ago, a case which shows that this opinion is not true. It was the following:]

Case I.—The patient was about fifty-five years of age, and unmarried. She had been suffering long under severe menorrhagia. The face was pale and anemic, and her health and strength broken down. On examining per vaginam, the os uteri was found closed; but the uterus felt somewhat large and distended; and Dr. Wood believing, with me, that the hemorrhagic drain which was present might be the result of an intra-uterine polypus, the mechanical dilatation of the uterine cavity was advised, but given up, in consequence of local treatment being objected to. In a few weeks the patient sunk, under the continuance of the hemorrhage. On opening the body, Dr. Wood and I found the lower part of the cavity of the uterus distended by a polypus, of the size of a small plum, and attached to the back wall of the uterus by a narrow half-broken stalk. The lining membrane of the uterus was white and bloodless; but the polypus was red, from engorgement and effusion of blood in its tissues. Its structure was fibrous; and there was another small fibrous tumour imbedded in the walls of the uterus, near the uterine extremity of the right Fallopian tube. It had descended lower down than at the time we examined, so as to have already dilated the cavity of the cervix; and the os, at the time of death, had begun to open. It was evident that, if the cavity of the os and cervix could have been artificially dilated during life, the polypus would have come within reach, and the patient's life been saved.

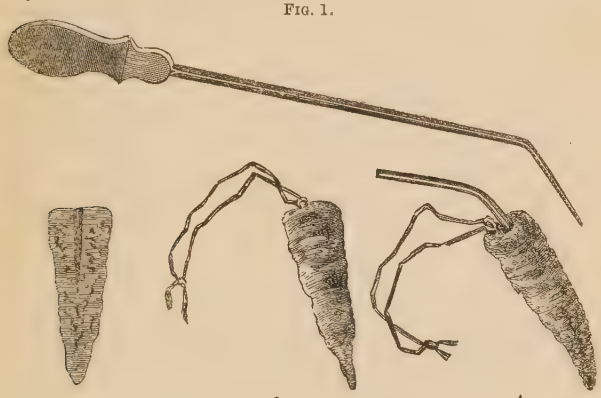
When nature, in cases of intra-uterine polypi, begins to expel the tumour, and open up the os uteri, we may, at that stage, find it possible to make a diagnosis of the disease, by being able to "*feel* the rounded

tumour within". If art could furnish us with any means of producing, at will, the same extent of opening of the os uteri, it would enable us in the same way to "*feel* the rounded tumour within" with our finger; and it is evident that, by this means, we should possess a power of detecting, with all the certainty of physical diagnosis, the existence or not of the disease within the cavity of the uterus, in cases in which the attendant rational symptoms—as the menorrhagia, uterine leucorrhœa, and perhaps the swelled state of the neck or body of the uterus—might lead us to conjecture the probable presence of an intra-uterine polypus.

In 1844, in a communication laid before the Medico-Chirurgical Society of Edinburgh, I proposed a means of safely opening up the cavity of the cervix and body of the uterus, to such an extent as might enable us to introduce a finger into the uterine cavity, for the purposes of diagnosis and operation in this and other diseased states of the organ. The means described consisted in the introduction of sponge-tents into the os and cavity of the uterus, so as gradually to dilate these parts to the degree required. For several years past I have been constantly employing this means of dilatation of the uterine os and cavity, for a variety of purposes and indications. The sponge-tents used by myself and my professional brethren in Edinburgh, are manufactured by Duncan, Flockhart, & Co. They are of a narrow conical or pyramidal form; and used of many different sizes and lengths, according to the object in view. These tents are made by dipping a piece of sponge in a strong solution of gum-arabic—tying and compressing this sponge around a central wire, as its axis, into the required conical form, by a continuous layer of whip-cord, drying it thoroughly, removing the cord, and subsequently slightly coating the surface of the tent with tallow, or axunge and wax, to facilitate its introduction. The central wire passes only for half-an-inch or an inch into the base of the cone (see section of one in Fig. 3); and the opening left by it serves as an aperture to transfix the tent with the tip of the metallic director (Figs. 1 and 4), used for guiding and introducing the tents through the os uteri. They are introduced like the uterine sound or the catheter; the handle of the metallic director, with the sponge affixed to it, is held and manipulated by the left hand, while the fore-finger of the right hand touches the os uteri, in order to guide and direct the apex of the tent into that opening. The old forms of sponge-tent used by surgeons, and made of sponge steeped in preparations of wax, required for their expansion and development the aid of heat, in order to dissolve their retaining ingredient. The tent I have described, made by steeping sponge in a solution of gum, requires moisture, and not heat, for the solution of its retaining material, and for the expansion of the sponge. Very generally the secretions of the surrounding mucous canal afford a sufficient quantity of moisture for these two purposes; but if not, a small quantity of tepid water may be injected from time to time into the vagina. Usually a well-made tent takes twenty or thirty hours to expand to its full extent in the os uteri; and dilates to four or five times the diameter it presented in its original compressed state. Generally the first tent opens up the os and cavity of the cervix, and allows the finger ample space to examine sufficiently its contents, and the state of its parietes. If it is necessary to open the uterine cavity higher, to enable

the finger to pass into the cavity of the body of the organ, a succession of tents are usually required; and they must be passed completely through the os internum or narrow portion, lying between the cavity of the cervix and cavity of the body of the organ. The use of the tent for a day, generally, as I have already stated, dilates the os uteri and cavity of the cervix sufficiently; and the employment of the sponge is accompanied with little or no feeling of uneasiness. When it is necessary to examine the state and conditions of the interior of the cavity of the body of the organ, the persevering use of a series of larger and larger tents for several days is usually requisite; and the dilatation of the os internum and body of the organ sometimes, but not always, causes a feeling of uneasiness and pain, that may require the use of an opiate. I have omitted to state that the tent is always prepared with a string affixed to its base, to allow of its easy removal.—(See Fig. 2). In using sponge tents, it should be remembered that, when sponge is in contact with the maternal passages for some hours, it always exhales, when removed, a very fœtid odour.

FIG. 1.



The wood-cut represents sponge-tents, and the instrument for introducing them.

Fig. 1 represents the strong metallic handle or director employed for the introduction of the tents. At the distance of nearly two inches from its point, it is bent at an obtuse angle. From this angle the instrument is made to taper to a blunt point.

Fig. 2 represents a sponge tent with the string for its extraction attached to its base.

Fig. 3 shows a section of the tent with the linear cavity in its base intended to receive the point of the metallic director, as is represented in Fig. 4.

For dilatation of the unimpregnated os uteri, the tent should be selected as regularly conical as possible, and with the apex neither too blunt and rounded to pass the os, nor too slender and flexible so as to double back in the attempt. The spirally grooved surface of the tent, resulting from the compression of it by the whip-cord during its manu-

facture, tends to retain it *in situ*, till its expansion commences. It, perhaps, ought to be added, that the introduction of the sponge-tent into the os and cavity of the uterus, should be effected without the use of the speculum. The sense of touch serves, in this and some other analogous operations, infinitely better than the sense of sight.

By the use of sponge-tents introduced daily, and of increasing size and length, we may reach a polypus when affixed and sessile even upon the fundus uteri. One of the first cases in which I dilated the uterine cavity to its extreme height, was the following:—

Case II.—In 1844, a patient, æt. thirty-six, under the care of Dr. Graham of Dalkeith, had a miscarriage, from the effects of which she never satisfactorily recovered. Previously she had borne four children, When I first saw her, two or three years afterwards, she was emaciated and extremely pallid from the excessive loss of blood which she had been sustaining for some time; and her weakness was such, that it was with difficulty she could rise and walk across her bed-room. In August 1847, I dilated fully the interior of the cervix and body of the uterus by a succession of sponge-tents, and at last felt a hard round fibrous polypus seated at the very fundus of the uterus, and projecting, of the size of a walnut, into the upper part of the cavity of the organ. Dr. Ziegler, Dr. Toogood of Torquay, and other professional friends, confirmed this diagnosis. It was impossible to ascertain how it was pediculated, or to operate upon the pedicle. We could only reach the round body of the tumour; and that I compressed strongly and repeatedly in the blades of a lithotomy forceps, with the view of breaking down its tissue, so as to destroy the vitality of the polypus. A purulent discharge followed, and three largish pieces of organised structure were subsequently cast off. Her recovery of health, after these discharges ceased, was gradual but perfect. There has been no return of menorrhagia. About a year ago she called upon me, and the change from excessive pallor and emaciation of the face, to the hue and ruddiness of health, was so great, that I had difficulty in being convinced of the identity of my former patient.

The *symptoms* which might, *a priori*, induce a practitioner to conjecture the probable existence of an intra-uterine polypus, are of a very uncertain and equivocal character. The polypus, while still included within the uterus, is principally liable to give rise to the following groups of symptoms:—

1st. Menorrhagia, in consequence of the discharge of blood from the surface of the tumour. The attendant hemorrhages take place particularly at the menstrual periods, but are apt to recur also at other times; and the blood is sometimes fluid; sometimes coagulated; occasionally there is an almost constant red stained discharge. The effects of these repeated floodings upon the constitution of the patient vary with their amount: but if they go on increasing (as they usually do) in quantity and frequency, the patient's constitution becomes gradually more and more shattered and broken down by the amount of hemorrhagic discharge; and all the symptoms of anemia in their most marked degree at last supervene, as pallor of the face and lips, great muscular debility, palpitation, vertigo, dyspepsia, œdema, &c.

2dly. The discharge of mucous, purulent, or serous matter from the cavity of the uterus, in consequence of the mucous membrane of the organ becoming often irritated, inflamed, and even ulcerated by the presence and pressure of the polypus. If a severe leucorrheal discharge is present, and we ascertain by the speculum that it does *not* originate in ulceration or other morbid state of the external surface of the cervix, or of the vagina; and if we further detect, with the speculum, the discharge issuing from the cavity itself of the uterus, the probabilities of it originating in some pathological irritation within the uterus, will be necessarily increased. Sometimes the discharge, in cases of polypi, is fœtid, especially if it be retained, or mixed with decomposing blood.

3dly. Increased size of the cervix and body of the uterus in consequence of its interior being distended by the presence of the polypus, is traceable in those cases in which the polypus is of any great size. Not unfrequently intra-uterine, like vaginal polypi, are found combined with the presence of fibrous tumours in the walls of the uterus; and by these tumours the magnitude of the organ is increased, and its shape rendered more or less irregular. Fibrous tumours of the uterus are seldom or never situated in the walls of the cervix; and if the swelling and distension affect the cervix. there is consequently much more chance of its being a polypus and not an interstitial fibrous tumour, than when we have similar symptoms attendant upon a similar augmented state of the body of the organ. Further, the probability of the disease being intra-uterine polypus would be increased, if, on successive examinations, we had an opportunity of ascertaining that the enlarged and distended state of the cervix was descending gradually lower and lower down towards the os; for polypi in their progress and descent gradually dilate the cervix from above downwards in the same way as happens in pregnancy or abortion. They are born by a kind of chronic labour.

4thly. There may be symptoms of irritation and pressure upon the bladder, rectum, &c., if the polypus happen to be so large as to exert mechanical compression upon these or other parts, or dysmenorrhœa if it fills up the cavity of the cervix. And sympathetic pains may be present in the loins, limbs, &c., or there may be sympathetic disturbance of the stomach, heart, &c., if the uterus is much irritated and excited by the presence and distension of the polypus.

But one or more of the preceding groups of symptoms may be altogether absent, though the uterus contain an intra-uterine polypus. The mechanical and sympathetic symptoms last alluded to are the most uncertain of all. For while almost all uterine diseases, however intrinsically different, give rise to similar secondary and sympathetic symptoms, we have often in other instances of the very same diseases, these same symptoms entirely wanting; just as in one woman during pregnancy we sometimes see severe, even serious, local, and constitutional symptoms; and in another woman, or even in the same woman in another pregnancy, we see the same condition of the uterus unattended by any special, local, or constitutional disturbance. Again, there may be no ascertainable increased volume of the uterus, as the polypus, especially if it is vesicular, and originates in the interior of the cervix, may be far too

small to lead to any appreciable augmentation in the size of the organ, although, notwithstanding, the menorrhagia may be great; for the extent of flooding does not depend on the size of the polypus, small polypi like small hemorrhoidal excrescences, often being the source of severe and repeated hemorrhages. Further, the leucorrheal discharge which is sometimes attendant, may be entirely absent, as the polypus may not be irritating the mucous surface of the cavity in which it is inclosed. And lastly, polypi occasionally, though not very frequently, are present for a long series of years without producing any degree of hemorrhage or menorrhagia. In the following case, for example, there was a state of long-standing amenorrhœa, instead of menorrhagia, co-existent with the presence of a polypus, though the two conditions (the amenorrhœa and polypus) had probably no causal relation to each other.

Case III.—A poor woman, from East Lothian, aged about 35, and of a weak and debilitated frame, came, some three or four years ago, to ask for advice regarding the state of her health. She described her case as one of long-standing amenorrhœa. For five or six years the catamenia had been entirely absent; and she ascribed her broken health to this cause. On examining the uterus and ovaries, in order to ascertain if there was any organic change to account for the amenorrhœa, I found, with the uterine bougie, the cavity of the os and cervix uteri very small, and the latter apparently obstructed, about three quarters of an inch from the orifice. I introduced a long thin sponge tent, with the view of determining more correctly the state of the cervical cavity. On removing the sponge, two days subsequently, I found the lower part of the cervix natural, but a flattened polypus, of the size of a small cherry, attached by a short pedicle to the interior of the higher portion of the cervical cavity. The pedicle was easily seized with a pair of long slender polypus forceps, and separated by torsion or evulsion. For some time subsequently to this little operation, menstruation recurred,—the irritation of the sponge tent having probably so far roused the uterus to a restoration of its secreting functions; but a patient from the same neighbourhood, about half a year ago, informed me that her health had relapsed again into its former unsatisfactory state.

The polypus, in the preceding case, was intra-uterine. During the past autumn I removed a uterine polypus, which had long passed down into the vagina, and yet had never given rise to menorrhagia.

Case IV.—The patient, 55 years of age, had, for the last twenty-five years, been aware of the occasional protrusion, between the labia, of a portion of what she supposed a fold of thickened and insensible skin. When she first noticed it, she had called the attention of her medical attendant to it, an eminent London obstetrician, under whose kind care she was for many years placed. He examined the tumour and its relations; but advised her to let it alone. Two or three years ago a little sanious discharge began to appear, and continued to recur almost daily. On examining the projecting body, I found it an elongated polypus, of the size and figure of the fruit of the date, and depending by a long slender stalk, which passed upwards through the os uteri. I divided the stalk with a pair of blunt-pointed scissors, immediately below the os uteri, and in four days afterwards the patient set off on a long journey. The

polypus was of a dense cellular structure. At one point, near its fundus, its surface was ulcerated. The ulcer was of about the size of a sixpence, and, no doubt, the source of the discharge that had latterly appeared. Perhaps the removal of this polypus, when it was first discovered, would have enabled the patient to become a mother, and saved from extinction one of the highest and oldest titles in the kingdom.

Cases, however, like the above, of uterine polypi, of long duration, without attendant hemorrhage, are exceptions, and not very common exceptions, to the general rule.

When an adequate degree of dilatation is obtained, the finger will be enabled to touch the tip of the polypus; and then the pediculated or polypous character of the tumour may be farther made out by passing either the finger or a uterine sound between its body and the containing cavity of the uterus. In making this examination, as in making most other examinations of the uterus, a rule requires to be followed which is too often forgot, namely, to use both hands for the purpose. For if we are examining the uterus internally with the forefinger, or fingers of the right hand, the facility and precision of this examination will be found to be immensely promoted by placing the left hand externally over the hypogastric region, so as to enable us by it to steady, or depress, or otherwise operate upon the fundus uteri. The external hand greatly assists the operations of that which is introduced internally; and farther, we can generally measure, between them, the size, relations, &c., of the included uterus.

If without, or before, using sponge-tents, we are desirous to examine at the time when the os uteri is naturally most relaxed, we will find that time to be either immediately after a menstrual discharge, or immediately subsequent to any severe attack of intercurrent hemorrhage. Under such circumstances, we can sometimes introduce the finger partially into the os uteri and ascertain the presence of any morbid body in the lower segment of the cervix; when in the same patient, at other times, this orifice is so completely shut as to prevent entirely such a proceeding.

[Remarking upon the fact that pain very rarely attends intra-uterine (as well as other) polypi, Dr. Simpson observes:]

Sometimes, however, as they are pressing upon the lower part of the cervix and os uteri, or distending and passing through these parts, uterine contractions and pains temporarily supervene, similar to those of miscarriage; and, if there is any difficulty in the passage of the tumour, these pains may become exceedingly severe. In a case, in which a fibrous tumour of the uterus that had undergone the calcareous degeneration, and part of which had assumed a semi-pediculated or polypous form, the recurrent pains, when the mass came down upon the os uteri, appeared at times as extreme as those of the last stage of labour.

Case VI.—The patient, now sixty-nine years of age, the mother of several children, had for several years suffered from recurring slight attacks of uterine hemorrhage. In February, 1848, I saw her with Dr. Hunter. The os uteri was drawn up so high, that it was with great difficulty that I could reach and touch it; the top of the vagina stretched up in the form of an inverted funnel, the apex being placed at

its upper or narrow extremity, and hence it was impossible to introduce or use a speculum. At the same time, the abdominal parietes were so thick and full, that it was impracticable to ascertain in any way the state of the uterus by an external examination. Not feeling a polypus, however, I left with the idea that the cause of the menorrhagia was some form of carcinomatous disease of the uterus. Subsequently, in the month of July, all her symptoms became aggravated, and very severe bearing-down pains were superadded. These pains recurred regularly once a day, lasted in paroxysms for several long hours, and always left the patient weakened and prostrated. In consequence of them, Dr. Hunter made another examination of the vagina, and found the os uteri, which was now pressed lower down, filled with an apparently irregular bony mass. I saw her again, and removed the calcareous mass, filling up the os uteri, with a portion also of fibro-calcareous tumour, which we found above it, and distending the lower part of the cervix. The irregular calcareous portion protruded through the os uteri, was about the size of a hazel-nut, and the portion of fibro-calcareous tumour above it nearly four times that volume. The daily fearful pain which the patient had been lately enduring immediately ceased, and everything looked so favourable that we had every hope that the whole of the fibro-calcareous tumour, or polypus, had been removed. Last February, however, after some unusual exertion, the pains again recurred more severely, if possible, than before; and with this difference, that the attacks of them were now twice a-day, instead of being only once, as on the first occasion. Opiates and sedatives had little or no effect towards their alleviation. On examining the os uteri, no new foreign body could be found anywhere within reach. As the patient's strength and spirits, however, were rapidly giving way, I dilated the os fully, by a succession of sponge-tents, and found the cavity of the cervix occupied by another fibro-calcareous mass, larger than the first. After an ineffectual attempt to break it down and remove it, by strong lithotomy and other forceps, I dilated the os still farther with tents, with the view of, if possible, getting two or three fingers up to seize the tumour, and assist in its detritus and extraction. To allow the hand to pass into the vagina with this view, I was obliged to incise its orifice; and, after no small difficulty, I was enabled to break off, by the fingers and forceps, four or five fibro-calcareous pieces from the mass in the cervix; and these pieces, when afterwards conjoined together, were found to form a roundish semi-pediculated tumour, of the size of an orange. In order to enable her to sustain the pain of these proceedings, the patient was kept, during this tedious operation, under the influence of chloroform. The pains again ceased, from the date of the removal of this second intra-uterine tumour; and, under the kind care of her son, himself a physician, our patient made a good and steady recovery, and her health was restored by spending some of the autumn in the country. There still, however, remains in the uterine parietes some fibro-calcareous structure, as I lately ascertained by passing a uterine bougie into the elongated cavity of the uterus, and striking it against its hard stony surface.

The *treatment* of intra-uterine polypi requires to be varied according

to different circumstances, but particularly by the tendency or probability of the tumour passing downwards or not through the os; by the effects of the symptoms or the urgency of the case; and by the size and site of the polypus.

Two plans of procedure may be followed according to the nature and necessities of the case, viz., first, to wait till the polypus descend farther; or, secondly, to remove it immediately. It is a generally acknowledged principle in obstetric surgery, that a polypus of the uterus should be extirpated as early after its discovery as possible. But when such a tumour is discovered still included within the uterine cavity, and the polypus seems gradually but certainly making its way downwards, through the cervical cavity, and the hemorrhage and other symptoms are not urgent, it will assuredly be better to wait for its descent through the os; for after that its removal becomes much more easy and simple. The dilatation of the os and cervix by the sponge-tents will promote and facilitate its descent; and perhaps the internal use of the ergot of rye may aid it. But the degree of attendant hemorrhage and debility may be too great to entitle us to postpone the removal of the polypus; or the tumour may be attended by such a short pedicle as not to be capable of leaving the uterine cavity without dragging down with it, or inverting the fundus or some parts of the parietes of the uterus; or it may be retained in its descent by adhesions formed between the surface of the uterus and the surface of the polypus. I once witnessed the dissection of a case of a large fibrous polypus included in the cavity of the uterus, and where inflammation had been present before death; the surface of the polypus was adherent to the surface of the uterus through the medium of a recently effused false membrane.

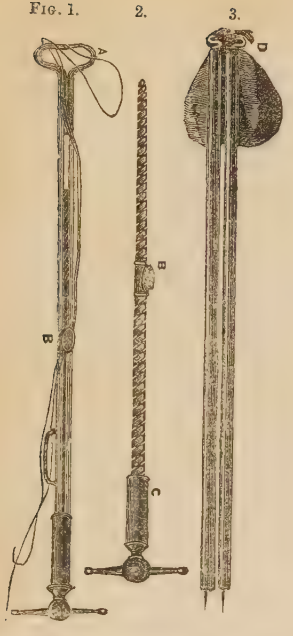
[Where, then, there is severe hemorrhage, and improbability of the speedy descent of the tumour, Dr. Simpson thinks that we ought to remove it at once. The first step in the operation is the dilatation of the os uteri by means of sponge-tents; and the division of any obstructing bands of the os or cervix, at the time of operation. The removal of the polypus will then be effected in different ways according to circumstances. Dr. Simpson says:]

We may only be able to accomplish this object by contusing and crushing the tumour, as I have described in a case already detailed. (See Case II.) In the instance in question, I grasped the polypus, for this purpose, with strong lithotomy forceps. In another similar case, after fully dilating the os and cervix, I seized a large intra-uterine polypus between the jaws of a screw-propelled lithotomy instrument—invented for the purpose of crushing vesical calculi –and was enabled, by it, to crush and destroy readily the structure and vitality of the included tumour. Occasionally, we may be enabled to divide the stalk of the polypus with a silver wire or ligature, acting on the principle of the chain saw; or we may reach it with very curved blunt-pointed scissors. The following case may serve to illustrate one of the last-mentioned methods of operating:—

Case VIII.—A patient, æt. 36, about three years ago began to suffer under menorrhagia and dysmenorrhœa. The catamenia became both too frequent in their return, as well as much too great in quantity; but

there was little or no leucorrhœal discharge. Latterly coagula of blood accompanied the menstrual periods, and the patient felt much weakened by each attack. The dysmenorrhœa generally came on on the second day of menstruation, and confined the patient for a couple of days, the third day being usually one of much sickness as well as pain, particularly if the patient tried to assume the erect posture. I first saw this lady in July of the present year, and found the uterus somewhat enlarged, and externally irregular in form, from the presence of one or two small fibrous tumours in its body and fundus. But the os uteri was shut, and I could not ascertain if the debilitating hemorrhage was the result merely of the irritation of these tumours in the parietes of the uterus; or whether one of them, forming a polypus in the cavity of the organ, was its source. I wrote her medical attendant to dilate the os in order to determine this point; and she returned home to England. In September she came back to Edinburgh; but, in consequence of the state of her health, I did not venture to dilate fully the os and uterine cavity till towards the end of October. On doing so, I was enabled to detect the rounded extremity of a polypus hanging down, into the cervical cavity. During two or three days it descended somewhat lower, but ultimately remained fixed and stationary above and within the os. I found I could not move it further downwards, by fixing a vulsellum into it, and applying some dragging force. On the 6th of November, assisted by Dr. Duncan, I applied a silver wire above the body, and around the neck of the tumour, by the instrument figured in the accompanying wood-cut. After the instrument was fixed and adjusted, a few turns of the screw made the wire cut through the pedicle of the polypus, and without any pain or suffering on the part of the patient. The separated tumour was then pulled, by the vulsellum, through the os uteri. The polypus was of the size and shape of a plum, with a small portion of the pedicle attached. It was fibrous in its internal structure. The patient's recovery was slow, but uninterrupted. She has menstruated once since the operation, but without the discharge being excessive, as formerly, either in quantity or duration (it lasted only three days); and also without her former distressing dysmenorrhœal pains.

The instrument employed in the preceding case is a modification of one kindly sent to me by my friend, Dr. Sabine, of New York. I am told it has been successfully used by various American practitioners for the removal of polypi in the vagina. The advantage which it possesses over the instruments of Niessens, Gooch, Davis, and others, in the removal of intra-uterine polypi is, that the screw power with which it is furnished, enables us to use it with the power of a small chain-saw, for the immediate division of the pedicles of the polypi. And it is almost superfluous to observe, that if we can finish our operation, it will be much safer for our patient than leaving a rough instrument within the cavity of the uterus. The instrument itself consists of two parts, viz., two hollow canulæ, like those pertaining to the instruments of Niessens and Gooch; and of a second part, resembling the polypus instrument of Graefe of Berlin, with this difference, that it has a ring affixed to its top, of a heart-shaped figure, and intended, first, to receive the two canulæ, with their contained ligatures, and afterwards to serve as a point of re-



The wood-cut shows the instrument alluded to in the text, for seizing and dividing the pedicle of a polypus.

Fig. 3 represents the two canulæ as they stand after their contained wires have been passed around the pedicle, *d* (Fig. 3), of a polypus.

Fig. 1 shows the instrument used specially to divide the pedicle; *a* is the ring of the instrument, into which the canulæ are slipped, and which is run up along them to the pedicle (*d*); *b* is the knob or button on which the wires are twisted—it is made to descend along the linear slit by revolving the handle *c*.

Fig. 2 shows the screw enclosed in the instrument (Fig. 1), with the handle *c*, and button *b*, in which it moves.

sistance during the cutting action of the ligature upon the pedicle of the tumour. The canulæ and ligatures (Fig. 3) are first applied in the same way, and according to the same rules, as those of Niessens and Gooch. After the pedicle is encircled by the ligature, the two lower extremities of the canulæ and included ligatures are passed through the ring (*a* Fig. 1) of the second portion of the instrument. This second portion of the instrument is then run up, with its ring surrounding the included canulæ, till it reaches the pedicle of the tumour; the projecting side of the ring being turned towards the pedicle. The canulæ are then slipped off, and withdrawn, leaving the wires or ligatures alone in the terminal ring of the instrument. Subsequently, these wires are twisted around, and fixed upon, the knob (*b*, Figs. 1 and 2) attached to the screw (Fig. 2). Lastly, by moving the knob downwards, by the operation of the screw, the ligature is made to cut into and through the pedicle.

The preceding remarks, relative to the treatment of intra-uterine polypi, principally refer to these tumours when they happen to be of a large size. But uterine polypi are often too small to be removed by the knife, scissors, or ligatures; and yet these small polypi not unfrequently lead to severe and long-continued menorrhagia. From the analogy of hemorrhoidal tumours, we know that the mere size of a polypus is not

to be taken as any measure of its capability of producing hemorrhage. Small vesicular, mucous, or cellular polypi sometimes grow from the fundus uteri, giving rise to considerable and long-continued hemorrhagic discharge. I have preserved specimens of them from the dead subject, and have met with them in the living. They can hardly be properly termed polypi, as they are scarcely pediculated at their attachment, and sometimes short, but in other cases long and slender, in their body.

The following case may be cited as an illustration of this form of the disease:—

Case X.—A lady, the mother of ten children, became irregular in her menstrual discharge during her 44th year. At times it was wanting at the usual monthly periods, at others it amounted to menorrhagia. About a year after this irregularity commenced, such an amount of fluid blood and coagula escaped as at first to lead on her part to some suspicion of miscarriage; but it continued to go on profusely for two or three weeks. At the end of that time, I visited her, with Mr. B. Bell, and Dr. Malcolm. On examining the uterus, we found a small vesicular polypus attached to the inner surface of one of the lips of the os, and it was easily removed by avulsion. The discharge, however, was not abated in consequence, as we expected. A series of sponge-tents was then introduced, so as to open up, first, the cavity of the cervix (which was found free from additional polypi), and ultimately the cavity of the body of the uterus. When the distension of the whole uterine cavity was at last completely effected, both Dr. Malcolm and I found that we could touch two or three small slender polypoid bodies, hanging from the very fundus of the uterus. I removed them cautiously from the surface to which they were attached, with the nail of the first finger. After this the hemorrhage ceased, but some local treatment was required to cure the ulcerated state of the cervix. The polypi were removed in April. The patient went soon afterwards to spend the summer in the country, where she soon gained strength, and enjoyed much-improved health. I saw her lately. The menorrhagia had not recurred, but she still looked anemic, having never recovered her colour since the hemorrhages in spring.

Dr. Malcolm informs me that, since meeting with the above case, he has seen another similar one, and treated it successfully in the same way. I may add, that in several cases of chronic and severe menorrhagia, in which I have been induced to open up the cavity of the uterus with sponge-tents, in order to ascertain whether there was any small intra-uterine polypus present or not, I have merely found the interior of the uterine cavity rough and granulated at particular points, which I have generally tried to remove and scratch off with the nail. Whether owing to their removal or not, or owing to the irritation resulting from the pressure and distension of the sponge, I know not, but certainly in two or three cases, the menorrhagia has subsequently abated and ceased.

By far, however, the most common site for the origin of small vesicular polypi, is the interior of the cervix uteri. In fact, the small cellular or vesicular form of cervical polypus, is infinitely the most common form of polypous disease of the uterus.

It is, I believe, the rule rather than the exception to it, that when we

find one (perhaps protruding at the os uteri, we shall find, on further search, that there are others, sometimes to the number of four, five, or six, springing from other points of the interior of the cervix, and not discoverable till the cavity of the cervix is dilated by a sponge-tent. When hanging from the os uteri, their stalk is sometimes so loose and long, and the small depending polypus is itself so small and soft, that it moves away before the finger in making a tactile examination, and one unaccustomed to this peculiarity will not feel perfectly sure of the presence of such a polypus till the speculum is used, when the polypous body will be easily seen generally of a cherry-red, or purplish colour. Such polypi, though small, are often apparently the source of much menorrhagia and leucorrhœa, for they almost always co-exist with, and probably produce, some degree of ulcerative inflammation of the contiguous surface of the cervix.

In trying to remove these small vesicular polypi of the cervix, it is, therefore, to be held in recollection, that there are generally more than one present, and that to ascertain this point with any precision, it is necessary to dilate and expand the cavity of the cervix with a sponge-tent.

In more than one instance I have found these polypi (when their pedicles were perhaps long and easily broken) come off, imbedded in the surface and foramina of the sponge, which had torn them off during its expansion. But, in twenty-nine out of thirty cases, more methodic measures are required for their removal,—as scratching them off with a sharp nail, seizing and tearing them off with polypus forceps, or dividing their stalks with a pair of scissors. If we can use the speculum, these modes of removal are greatly facilitated by the sense of sight. Indeed, if we require to use the polypus forceps or scissors, for the removal of these small polypi, and guided by touch alone, we shall generally find the operation, though apparently simple in principle, one which is tedious and difficult to perform in practice.

The small vesicular polypi of the cervix have sometimes, as we have already seen, long pedicles. Occasionally, however, we find, co-existing with these pediculated polypi, others that are non-pediculated or sessile; and, occasionally after the cervix is dilated, we find others not raised yet above the level of the general surface of the mucous membrane of the part, but feeling imbedded like shot or peas in or beneath that membrane. In other words, we find, in some cases, these vesicular polypi in all their stages of formation, from small shut cysts, up to pediculated vesicular tumours. When such is the state of matters, we can only remove those that are more fully formed, by the nails, scissors, or forceps. To effect a complete cure, we require other means; and for this purpose the application of caustics to the mucous membrane of the cervix answers every indication. Nitrate of silver generally proves too weak for this purpose, unless repeated very often, and combined with scarification of the mucous surface. We possess a far more potent and certain caustic for the purpose, and one that is perfectly manageable, in potassa fusa. The surface of the os and cervix, when small vesicular polypi exist, is often found to be the seat of chronic inflammatory ulceration; and sometimes the submucous tissue, and the structure of

the cervix, is also the seat of chronic inflammatory hypertrophy and induration. When such a combination exists, the potassa fusa is doubly useful, as its application at once destroys the polypi, and sets up a new and healthy action in the affected and morbid tissues of the cervix. I have described elsewhere, its great value and mode of application in inflammatory induration of the cervix, and the power we have of immediately arresting and limiting its action by the neutralising effects of acetic acid. I need only add here, that I have now repeatedly found this caustic of the greatest possible use in obstinate and complicated cases of vesicular polypi of the cervix, such as I have above alluded to. —*Monthly Journal of Med. Science, Jan.* 1, 1850, *p.* 3.

139.—ON THE SUPPOSED FREQUENCY OF ULCERATION OF THE OS AND CERVIX UTERI.

By Dr. Tyler Smith, Physician to Queen Adelaide's Lying-in-Hospital.

[Referring to the statements made by Mr. Whitehead of Manchester, and Dr. Henry Bennet, on the frequent occurrence of ulceration of the os and cervix uteri, Dr. Smith observes:]

Practising as a physician-accoucheur, I must get the same class of patients as those treated by Mr. Whitehead and by Dr. Bennet. I am in the habit of using the speculum in cases of obstinate leucorrhœa in married females, and I trust with a desire to observe truly and faithfully, but I do not myself find uterine ulceration, at least not what seems to me to warrant this term, so frequently as Dr. Bennet, Mr. Whitehead, and some other gentlemen who have written upon the subject, in leucorrhœal cases—purulent or muco-purulent. I find inflammation, engorgement, induration, excoriation, patches of aphthæ, epithelial abrasion, and granulation often enough, but very seldom what I could call ulceration, in non-malignant and non-syphilitic cases.

The clearest description I can find of the so-called ulceration, is in Dr. Bennet's work, (pages 102 and 103), which I take the liberty of extracting, and certain expressions in which I have italicised; it occurs under the heading—

"*Inflammatory Ulceration.*—Inflammation may exist for years in the cervix and its cavity, without giving rise to any other anatomical changes than those which have been enumerated. This, however, is seldom the case. The mucous membrane lining these regions, and more especially that portion of it which is near the os, appears to be *peculiarly liable to take on ulcerative action.* Consequently, the existence of inflammation *in the great majority of instances* is soon followed by the manifestation of the ulcerative process. Ulceration generally appears first round the os, and just within the cavity of the cervix. Many different forms or species of ulceration are described by continental writers, but, in my opinion, without necessity or advantage. An ulceration occupying the cervix uteri may present all the various modifications which suppurating surfaces offer in any other part of the body, from the minute granulations of a slight abrasion, to the livid vegetations of an unhealthy sore; but these modifications of the ulceration require in reality no division or classification.

"When an abrasion or excoriation only is present, the cervix is generally of a vivid red, and the granulations are often so minute, that it is at first difficult to ascertain whether the mucous membrane is abraded or merely congested, or to perceive the limit of the ulceration when once it has been ascertained to exist. The doubt, however, may be solved by lightly touching the suspected surface with the nitrate of silver. The abrasion immediately assumes a much whiter hue than the region which is merely congested, and its margin becomes well defined and evident. *An abraded or excoriated condition of the mucous surface is generally the form under which ulceration presents itself in the cavity of the cervix,* granulations of any size being seldom met with in this region.

"In its more decided form, ulceration of the cervix uteri is susceptible of presenting every possible variety. The granulations may be firm, of a vivid red hue, scarcely bleeding on pressure, or they may be large, fungous, livid, and bleeding profusely on the slightest touch. These fungous ulcerations are generally connected with torpor of the local circulation; when they are present, the congestion of the vagina and cervix is often very great, of a livid venous character, and the non-ulcerated surface of the cervix may present dilated varicose veins."

Now, this portrait, the general fidelity of which I admit, does not appear to me to warrant the profuse use of the term "ulceration", which in itself, and when applied to other parts of the body, has a definite and unmistakeable meaning. It cannot truly be said, that mere abrasions or excoriations caused by irritating leucorrhœal discharges are "ulcerations". We do not call the excoriation which occurs from similar causes in other parts of the body "ulceration". We do not call granulations upon mucous membranes "ulcerations", whether they secrete mucus or pus, or whether they bleed or not upon mechanical irritation. If we analyze this important passage closely, we shall find that granulations at the os and cervix uteri is the strongest fact testified to in support of the theory of "ulceration". Dr. Bennet states, that "an ulceration occupying the cervix uteri *may present all the various modifications which suppurating surfaces offer in any other part of the body,* from the minute granulations of a slight abrasion to the livid granulations of an unhealthy sore". But, immediately afterwards, he negatives this by adding, "*An abraded or excoriated condition* of the mucous membrane is generally the *form* under which ulceration presents itself in the cavity of the cervix, granulations of any size being very seldom met with in this region". Thus, it is evident, that even in the absence of granulations, Dr. Bennet calls "an abraded or excoriated condition" a "form" of "ulceration". From his own descriptions, it is evident that Dr. Bennet classes abrasions, excoriations, and granulations together, as forms of ulceration, a proceeding which it appears to me is utterly opposed to all sound pathology. In this way we may explain the great frequency with which ulceration of the os and cervix uteri is declared to be met with.

If we consider excoriation or abrasion as genuine ulceration, probably no woman ever passes through life without suffering from this form of disease. In the virgin uterus, the circulation is frequently modified by

the recurrence of menstruation, ovarian irritation, mental emotion, the varying conditions of the bladder and rectum; and in constitutional ailments, the vaginal and uterine secretions, in common with the other secretions of the body, are frequently depraved. Excoriation and abrasion of the mucous membranes are easily accounted for under such circumstances. Menstruation alone, in the turgidity of the uterus and ovaria, before the catamenial flow is established; in the exudation of blood from the surface of the uterus; and in the perforation of the peritoneal membrane for the elimination of the ovule from the ovary, trenches very nearly upon pathology. The slightest divergence from the ordinary function merges into disease.

In married women, and those who have borne children, other prejudicial causes in addition to these are in operation—such are the mechanical irritation of coïtus, the risk of laceration of the os uteri during the passage of the child in parturition, and the state of the uterine orifice which obtains after labour, and the return of the organ to quiescence. After labour, the orifice of the uterus does not contract smoothly, so as to leave the os uteri regular and even, but it becomes puckered and contracted unevenly. In irritable conditions of the mucous membrane of the uterus and vagina, or in a morbid state of the utero-vaginal secretions, these folds or corrugations are very liable to be chapped or excoriated, and I believe this is often mistaken for ulceration. All these, and other causes which I might enumerate, explain the frequency with which the os uteri deviates, in colour, volume, and secretion, from the strictly healthy standard. In fact, we may compare the upper part of the vagina to the fauces, which is seldom found perfectly healthy in any subject who may be examined. Some of the indurations and enlargements of the os and cervix uteri appear to resemble enlarged tonsils, and, like them, to increase in size without any amount of active inflammation.

The granulations which are sometimes found surrounding the os uteri —which may secrete mucus or pus abundantly, and which may bleed on being roughly handled—are, I have no doubt, the result of inflammation; but they resemble *the granular state of the conjunctiva,* rather than the granulations of a true ulcer, the granular os uteri offering no edges or signs of solution of continuity, by which we might satisfactorily declare it to be an ulcer. The *granular os uteri* would be a more correct designation, in such cases, than "ulceration" of the os uteri. Some of the so-called ulcerations appear to be nothing more than patches of thickened epithelium, or portions of the os and cervix, from which the epithelium has been melted away by acrid or irritating secretions. We can imitate this condition of the parts by the slight application of the nitrate of silver —sufficient to affect the epithelial covering, but not sufficient to injure the mucous membrane beneath.

It appears to me that we can neither receive the existence of excoriation or abrasion; of granulation or fungous growths; the secretion of pus or muco-purulent matter; as affording undeniable evidence of the existence of "ulceration" of the os and cervix uteri. We must try ulceration in this part of the body by the same tests which we apply to ulcers in other parts of the economy. We must look for a solution of

continuity, with a secreting surface, separated from the healthy structures, having defined edges, everted or inverted,—for an ulcer, in fact, in the common pathological meaning of the term. We find ulcers having these characters in the air-passages, mouth, stomach, intestines, bladder, and other mucous surfaces. There is no mistaking the characters of an intestinal ulcer after dysentery, and there ought to be no mistake about an ulcer of the uterus. Indeed, in the corroding ulcer of the uterus we unfortunately see that this organ is but too capable of taking on all the qualities of ulceration, in a degree only equalled by its extraordinary vitality, the organ being scooped out, or eaten away, in a comparatively short space of time. Cases are also met with, in which the os uteri has been destroyed by the sloughing, ulceration, and loss of structure, sometimes following the application of the more powerful caustic agents. We are, however, called upon, by the unlimited believers in uterine ulceration, to admit that ulcerative disease may exist for years, in its common form, without any perforation, excoriation, serious loss of substance, or altered configuration. Whether we test the so-called ulceration of the uterus by ulceration occurring in other mucous surfaces, or in the uterus itself, under undoubtedly ulcerative disease, the distinctive characteristics are wanting in the great majority of cases; and they certainly are not found, unless I am most egregiously mistaken, in the enormous proportion of 222 cases of ulceration to 300 cases of promiscuous uterine disease.

In all that I have said, I do not wish it to be supposed that I question the frequency of irritation, chronic inflammation, and subacute inflammation, in connexion with leucorrhœa. Recent writers would, however, treat leucorrhœa merely and solely as a symptom, not as an independent disorder. But I am well assured that it is often the disease itself, or at least all of it that we can appreciate; and that the irritable or inflammatory condition is excited secondarily, and mainly, by the morbid leucorrhœal secretion. Some change in the innervation or nutrition of the organ occurs; or it sympathises with a malady in some remote organ, and the secretions are consequently depraved. These depraved secretions irritate the surfaces with which they come in contact, and produce the visible signs of irritation or inflammatory action. We see these discharges sometimes inflame and excoriate even the external integument, but we should never dream of saying that the inflamed condition of the skin was the essential part of the disorder. The same observation applies to the uterus. Thus it is not pathological, nor useful, always to consider leucorrhœa as a mere symptom; and the old plan of astringent injections, though sometimes mischievous, cannot quite be dispensed with, for in some, even profuse leucorrhœas, an astringent injection, by arresting the utero-vaginal discharges, does more than any other plan to soothe inflammatory conditions, or rather, to suspend their causes.

[Dr. Smith also refers to the results of post-mortem examination. He states that out of 100 women examined *after death* by Mr. POLLOCK, at St. George's Hospital, only *four* cases presented distinct ulceration of the os uteri; and in three of these cases there was scrofulous ulceration in other parts of the body. Again, out of 180 women, subsequently examined *after death* at the same hospital, by Mr. GRAY, only *three*

cases presented distinct ulceration of the os and cervix. And similar results have been arrived at by other observers. In many cases, however, "slight abrasions, discolourations, and granulations were observed". Dr. Smith proceeds to remark:]

It may be asked, why bestow so much pains on proving that abrasion, excoriation, and granulation are not *ulceration?* Why dispute as to terms? Simply because a name rules treatment, and because the name of "ulceration" being first given, an heroical treatment, not without danger, is frequently resorted to where milder local applications or constitutional treatment would be equally efficacious. After Mr. Abernethy wrote his celebrated work on the 'Constitutional Treatment of Local Disease', his idea was pushed to its extreme, and local remedies were often most improperly neglected. Now, in all that relates to the uterine organs, the doctrines of Mr. Abernethy are in danger of being entirely refuted, and we are in some risk of utterly neglecting constitutional treatment, and of being entirely absorbed by local applications. This we cannot do without impeding the improvement of the treatment of this class of affections. When a patient is told she has an ulceration of the womb, she often thinks of an ulcer of the leg, or the cheek, &c., and is proportionably frightened, because of the importance of the organ which is the seat of the presumed disease. There is nothing women will not submit to to be freed from such a dire malady. At the present time a veritable uterine panic affects the upper and middle classes of society, and every woman with the slightest ache, or discharge, is not satisfied until the peccant organ has been ocularly inspected. I do not believe that this state of things, or its inevitable results, will conduce to the dignity and respectability of our profession. I do not hesitate to affirm, so far as I have eyes to observe and a judgment to weigh facts, that much exaggeration prevails respecting the frequency of this same ulceration of the os and cervix uteri—an exaggeration which should be calmed, so that the legitimate methods of examination may lead, not to a suspicion of our profession, but to real improvement in the diagnosis and treatment of uterine disease as it actually exists. We cannot safely repudiate either the local or the constitutional treatment of uterine disease. I have seen cases in which the local ailment has been as far as possible cured; nevertheless, the constitutional symptoms remained unrelieved. I have seen others, in which judicious constitutional treatment has cured the local malady without any topical treatment whatever. But in the combat against disease, we require both constitutional and local weapons; and any views which disparage either the one or the other, must cripple the resources of our art.—*Lancet, April* 20, 1850, *p.* 473.

140.— M. Velpeau *on Uterine Affections.*—Has not too much importance been attached to the various states and displacements of the uterus? Has not the treatment of uterine affection been much too localized, especially since the exaggerated doctrines of Lisfranc on this head? Such were the questions lately discussed at the Academy of Medicine of Paris, being suggested by a paper of Dr. Baud on the deviations and congestions of the uterus, with a new mode of curing these affections.

The tendency of the paper was to show that all the diseases of the uterus are much influenced by the general state of the health, and that the local condition ought to be considered only as a passive and secondary state. M. Velpeau expressed himself very sceptically as to the engorgements of the uterus, and M. Gibert spoke favourably of the notions of the older practitioners, who saw in the diseases of the uterus the manifestation of a diathesis which they combated by general means; the uterus being then considered as a cleansing organ, and the discharges not prevented. It would seem that the tendency to localize is rather too much indulged in now a-days, and it will certainly occur to many a pathologist, that revision is somewhat necessary in reference to uterine affections.—*Lancet, Dec.* 22, 1849, *p.* 671.

141.—*On Inflammatory Eruptions upon the Cervix Uteri.*—By Prof. SIMPSON, Edinburgh.—[The following observations were made by Dr. Simpson, at a Meeting of the Edinburgh Medico-Chirurgical Society:]

The common forms and effects of inflammation of the cervix uteri, viz. ulceration, hypertrophy, and induration of the cervix, were now well known to the profession. But the surface of the cervix was liable to other types of inflammation of an eruptive character, which apparently had hitherto been little, or not at all, studied by obstetricians: and were not yet described in works upon the pathology of uterine diseases. Among these special inflammations of the cervix uteri and top of the vagina, Dr. Simpson had observed eruptions referable to the vesicular, pustular, tubercular, papular, and erythematic orders of the classification of Willan and Bateman. *Herpes (herpes uterinus)* he had seen following the usual course of *herpes labialis* in two or three instances, in patients who had months previously been under treatment for common ulceration of the cervix; and Dr. S. suggested that perhaps this and other eruptions were occasionally the origin and basis of the common variety of granular cervical ulcer. *Acne*, in the form of chronic, hard tubercles and pustules, was by no means uncommon, and often co-existed with common ulceration. A papular form of eruption sometimes supervened in chronic cases of uterine disease, and was usually diffused over both the cervix uteri and interior of the vagina; sometimes having the characters of *Lichen;* in other instances presenting the appearances and severe itching symptoms of *Prurigo.* Eczema and patches of *Apthæ* also occurred. The treatment required to be varied according to the nature and character of the eruption, and consisted of the application of nitrate of silver, of medicated washes, and medicated pessaries, &c. In severe and distressing cases of prurigo of the cervix, vagina, and vulva, brushing the affected surface over with hydrocyanic acid (the strength of that of the Edinburgh Pharmacopœia), was mentioned as often giving the greatest relief.

Dr. PATTISON mentioned a case of prurigo of the vulva, which Dr. Simpson had seen with him, and where the hydrocyanic acid had at once afforded perfect relief.—*Monthly Journal, April,* 1850, *p.* 386.

142.—ON INTERNAL METRITIS, OR UTERINE CATARRH.

By Dr. J. Henry Bennet.

[The following observations are from Dr. Bennet's work on "Inflammation of the Uterus and its Appendages":—]

Internal Metritis or Uterine Catarrh (as defined by Dr. Bennet) is a rare disease:

It has only been considered common because it has been confounded with inflammation of the *cavity of the cervix*, a disease which, on the contrary, is very often met with. The mucous membrane that lines the cavity of the cervix, as we have seen, instead of being rudimentary, like that which lines the uterine cavity, presents a certain thickness, is plaited in folds, is abundantly studded with mucous follicles, and presents a more extensive surface than the uterine mucous membrane. It is not generally known, that the uterine cavity, in the unimpregnated state, is exceedingly limited in extent; so much so indeed, that, according to M. Vidal de Cassis, who made, some years ago, many careful experiments, in order to ascertain its capacity with reference to the use of injections in the disease we are studying, the uterus of a full-grown woman does not contain more than from nine to eleven minims of fluid. The cavity of the healthy cervix, if distended, contains about as much. The two cavities are distinctly separated one from the other, as I have explained, by a constriction, or natural sphincter, which has not been described by anatomists, but which is sufficiently powerful to offer a decided obstacle to the introduction of the uterine sound into the cavity of the uterus, in the healthy state. The existence of this constriction was first pointed out to me, some years ago, by Dr. Simpson of Edinburgh, as an indication of a morbid condition; but my subsequent researches have led me to believe that it exists in the healthy state, and that it is not *necessarily* morbid, even when carried to such an extent as to render the introduction of the uterine sound impossible. The cavity of the cervix is also deeper by half an inch than that of the uterus itself. The uterine sound, when passed into the uterus, is concealed to the extent of two inches and a half; of which, one inch and a half occupies the cavity of the cervix, whilst one inch only is in the uterus.

The above anatomical facts will at once explain the cause of the error into which even the latest continental writers on uterine catarrh have fallen. Whenever, on examining the cervix with the speculum, muco-pus is observed issuing from the os uteri, they conclude, without further examination, that it proceeds from the *cavity* of the uterus, and that the latter is the seat of inflammation. They do not reflect that the muco-pus *may* proceed, as it really does in nineteen cases out of twenty, from the cavity *of the cervix*. The result of a careful examination of all the cases of inflammation of the cervix uteri that I have seen during the last three years, amounting to between five and six hundred, with reference to this point, has shown me that, in the immense majority, the inflammation does not extend into the cavity of the uterus. I have been led to this conclusion by the observation of the following facts: Firstly. The dilatation which invariably *accompanies* inflammation of the cavity of the cervix, does not, generally speaking, extend to the

internal constricted point, or 'os internum'; the latter remaining contracted, so as not to allow the free admission of the sound into the uterine cavity. Secondly. Therapeutical means, carried so far only as the morbid dilatation exists, or to the os internum, effectually cure the inflammation, and put a stop to the discharge.

In some few cases, on the contrary, the os internum participates in the relaxation of the cervical cavity, so that the sound passes freely into the uterus,—the two cavities communicating. When this is noticed, the cavity of the uterus may or may not be inflamed; if it is, the discharge from the os uteri is more abundant, and presents peculiar characters; the local and general symptoms are rather different; and, what is conclusive, therapeutical agents carried into the cavity of the cervix alone, may not be sufficient to effect a cure. These latter cases are really cases of internal metritis, or uterine catarrh. The former (by far the more numerous) I look upon as cases of inflammation of *the mucous membrane lining the cavity of the cervix only, or of cervical catarrh.*

Causes. All the causes which gives rise to acute or chronic metritis, may also occasion internal metritis. It appears, however, to be generally met with in practice, as the result of the lengthened existence of inflammatory disease of the cervix and of its cavity. The inflammation gradually progresses along the cavity of the cervix until it reaches the os internum, and passes into the uterus. Indeed, considering the extreme frequency of inflammation of the entire cavity of the cervix, it is only surprising that the disease should so generally stop at the internal sphincter of that organ. The cause, however, of this clinical fact is, no doubt, the change in the structure of the mucous membrane, which commences at this point.

Among the causes most likely to give rise to internal metritis, a prominent position must be given to the inflammations that occur after parturition and abortion. When inflammation of the uterus follows the expulsion of the ovum, the surface on which the placenta was implanted is peculiarly liable to be attacked, and the seeds of chronic inflammation of the uterine lining membrane may thus be sown. In some exceptional cases, blennorrhagic inflammation may be a cause of internal metritis; the inflammation gradually extending from the vagina to the cervix, to its cavity, and to that of the uterus. This, however, I believe to be much less frequently the case than has been asserted.

Symptoms. Internal metritis being nearly always complicated by inflammation of the cervix, of its cavity, or of the substance of the womb, its symptoms are rather difficult to unravel; so difficult, indeed, that I do not believe the task has yet been accomplished satisfactorily by any writer. Internal metritis may be said to exist to a certainty, if the os internum of the cervix is so completely open as to allow the uterine sound to pass freely into the uterine cavity; if that cavity is increased in size, and more sensitive, and if, likewise, there is a more or less abundant *sero-sanguinolent* discharge, accompanied by dull, deep-seated pain in the region of the uterus itself,—that is, behind and slightly above the pubis,—and by a certain amount of general febrile reaction.

The sero-sanguinolent discharge is the most important of these symptoms; indeed, it may be said to be as characteristic of internal metritis as the rust-coloured expectoration is of pneumonia. The presence of blood in the secretion from the inflamed mucous surfaces is, in both cases, owing to the same cause—viz., the absence of an epithelial covering. The epithelium ceases to exist in the cavity of the uterus as in the cells of the lungs; and, when this is the case, the blood corpuscles exude in inflammation, and blood is expelled mingled with the secretion of the inflamed surface. This sanguinolent discharge, however, is not always present when there is inflammation of the interior of the uterus. It is only when the inflammation is severe, or in its period of greatest intensity, that it is observed. At the onset, in the period of decrease, and sometimes throughout the entire duration of the disease, the secretion may be merely muciform or puriform. When congestion alone remains, it may consist only of transparent mucus. If this is the case, it becomes more difficult to distinguish internal metritis from inflammation of the cavity of the cervix, in which the same discharges are present; in both, they may be seen issuing in a thick stream from the os uteri, when the cervix is brought into view with the speculum. We can then only be guided by the amount of discharge, by the morbid dilatation of the os internum, and by the other symptoms which I have enumerated.

In the healthy unimpregnated uterus, as I have stated, the cavity of the uterus is only one inch in depth, and so extremely small as merely to contain a few drops of fluid; consequently, the uterine sound, once introduced, has but an exceedingly limited range of motion. In internal metritis, the cavity of the uterus is dilated, increased in size, and the uterine sound moves with more freedom; the presence of the sound in the uterus, and its contact with the walls of its cavity, seem also to be attended with more pain than usual. This symptom, however, cannot be much depended upon, as the introduction of the sound generally occasions pain even in the healthy uterus; not unfrequently giving rise to nausea and faintness. Indeed, the cavity of the uterus appears to be naturally as sensitive as that of the cervix, and its os is little so.

Internal metritis is nearly always accompanied by a dull, aching pain in the back or ovarian regions, similar to that experienced in inflammation of the cervix, and by deep-seated pain in the region of the uterus. The uterus is generally rather swollen, enlarged, and sensitive to the touch, the entire organ being in a congested, irritable state. Internal metritis is also often accompanied by a slight amount of febrile reaction, occurring at intervals, after exertion, instrumental interference, or at the monthly periods. The catamenia are often disordered, generally manifesting themselves more frequently and more abundantly, lasting longer, and being attended with more pain than usual. Sometimes the flow of blood is so great and so lengthened as to constitute flooding; and this is more especially observed, as might be anticipated, when the sero-sanguinolent discharge is present. With some patients, however, on the contrary, the menstrual secretion appears to be diminished; but in either case it may be laid down as a rule, that the disease is aggravated by the appearance of menstruation. In addition to these symp-

toms, all the general sympathetic reactions which are observed in chronic metritis, and in chronic inflammation of the cervix, may be present. As internal metritis is generally complicated by these diseases, we may also have the peculiar symptoms which they present.

In some rare instances, inflammation of the lining membrane of the uterine cavity is followed by ulceration. When this is the case, the cavity of the uterus becomes considerably enlarged, and large quantities of pus, blood, and mucus, collect within it, and are expelled through the os uteri. Dr. Hall Davis exhibited, a short time ago, to the Pathological Society, the uterus of a woman thus affected, who died under his care; there were several large ulcerations on the internal surface of the organ. There are other cases on record; but this termination of internal metritis is undoubtedly very rare. The rudimentary mucous membrane of the uterus does not seem very liable to the ulcerative stage of inflammation.

From what precedes, it will be evident that, although a careful digital examination, combined with the use of the uterine sound, enables us to appreciate many of the symptoms of internal metritis, yet we can only obtain all the information we require to form a diagnosis, by carefully examining with the speculum the condition of the uterine organs. The cervix should be brought completely into view, in a good light, so as to enable the medical attendant, not only to ascertain its precise condition, and that of the inferior and external portion of the cavity of the cervix, but likewise to appreciate the amount and precise nature of the discharge that issues from the os uteri.—*London Journal, Feb.*, 1850, *p.* 147.

143.—ON THE TREATMENT OF INFLAMMATION OF THE CERVIX UTERI, AND ITS CONSEQUENCES.

By Dr. J. Henry Bennet.

[The following is from a review of Dr. Bennet's work, in the 'British and Foreign Medico-Chirurgical Review.']

Dr. Bennet first points out the treatment of simple inflammation of the neck of the womb; then of ulceration; and lastly, of ulceration with hypertrophy. "On glancing over the enumeration of the local means of treatment in simple inflammation of the neck of the uterus, and of its cavity, it will be seen that they consist principally in vaginal injections, hip baths, local depletion, and the use of caustics." With regard to injections, Dr. Bennet has found cold water extremely useful as a powerful tonic and astringent; and states that it may be used with great benefit when the inflammation has been subdued. Of medicinal astringents, after many experimental essays, he has arrived at the conclusion "that alum is by far the most efficacious of all these agents, with the exception of nitrate of silver." He uses it in the proportion of a drachm to a pint. Injections alone Dr. Bennet has found powerless to subdue *confirmed* inflammation of the substance of the cervix, or of the mucous membrane by which the cavity is lined; but he has found them most useful in inflammations of a lesser degree.

"Not only is it possible to treat successfully non-ulcerated inflammation of the cervix, *when slight*, and of recent date, merely by emollient and astringent injections, rest, and attention to the general health, without having recourse to instrumental examination, or to means of treatment requiring instrumental interference, but even slight ulcerations, unaccompanied by general inflammatory hypertrophy, will sometimes give way under the influence of these means."

Much, however, of the success of this mode of treatment depends upon the manner in which it is carried out, and it is very clear that unless particular attention be paid to explain the proper mode of using injections, in nine cases of ten they will be perfectly useless.

"In order to derive full benefit from vaginal injections, they must be properly and efficiently used; and this is never the case unless the patient be previously instructed how to proceed. When a fluid is injected into the vagina, the patient being in a stooping position, not only does it at once escape from the parts, but it rarely reaches the cervix or the upper part of the vagina. For this to be ensured, she should lie horizontally on her back, on the bed, on the sofa, or the floor, with the pelvis slightly elevated, so that the fluid may gravitate towards the internal structures. The natural contractility of the vagina expels the water, it is true, but not until it has well washed the entire vagina. A small quantity of the injection often remains imprisoned, as it were, in the superior cul-de-sac of the vagina, in the vicinity of the cervix, until the patient rises, when its own weight brings it away. . . . . The best instrument for vaginal injections is a pump-syringe, with a six inch elastic vaginal tube adapted to the longer tube, and presenting, at its extremity, four or six small holes in the sides as well as at the end. The vaginal tube can, after introduction, be directed to the region of the vagina where the cervix lies, and *any* quantity of fluid can be injected without its being withdrawn."

Local depletion equally illustrates the importance of attention to what are generally considered the minor details of treatment. The application of leeches to the uterus is not a new practice, but this duty is usually committed to nurses. "It is too much the custom," Dr. Bennet observes, "to prescribe 'a course of leeching' as they would 'a course of medicine;' giving directions for leeches to be applied once or twice a week, for one, two, or more months, without ascertaining whether the continuance of depletion is necessary or not." These directions are given to the nurse, who is generally sufficiently intelligent to apply them within the vagina, but no more; hence the inflamed surface is generally omitted; and in order to obtain indirect relief, a larger quantity of blood is drawn from the vagina than is at all necessary. Besides this, the patient may be most unnecessarily exposed to a considerable amount of pain, because "the external surface of the cervix has very little sensibility, and when the leeches fix on it the patient experiences little or no pain. Generally speaking, indeed, she is only aware of their presence from the dragging sensation to which suction gives rise in the course of a few minutes. The cavity of the cervix, on the contrary, is *acutely sensitive*, and, if a leech fixes in it, the patient may experience most agonizing pain." We quite agree, therefore, with Dr. Bennet, that this is a duty

which should not be intrusted to a deputy. "In reality, it is very desirable that the practitioner should apply the leeches himself, if he can possibly afford leisure. The time employed need not be long, and he is thereby able to form an opinion on many points which will guide him as to their repetition, besides having an opportunity of making a very careful examination of the uterine organs." It is of the utmost importance that local depletion should be performed efficiently, and the greatest effect produced by the least loss of blood; and frequent applications of leeches are highly detrimental, not only giving imperfect relief, but sometimes actually increasing the evil they were intended to remedy. "The application of leeches," says Dr. Bennet, "every week, or twice a week, for a lengthened period, appears to me sometimes to keep up a local congestion; thus tending rather to increase than to diminish the nutritive hypertrophy of the cervix and uterus, to which chronic inflammation gives rise." We fully accord our assent to this remark; as we believe every practitioner conversant with female complaints will do, when he recollects how temporary is the relief after successive depletions, and how often the returning pains are increased in severity. Local depletion is, indeed, too frequently of partial efficacy, and gives only temporary relief without curing the disease. *Cauterization* of the inflamed or ulcerated surface is essentially a new and most important principle in the treatment of these cases, and is that which has led to the greatest improvements in practice. But we also feel persuaded that it is that which may be the most easily abused, and may do mischief in proportion to its great power. Our author's observations on cauterization are most valuable; but none are more so than the cautions which he gives his readers, as to its occasional effect and its danger.

"It cannot be denied that cauterization of the cervix, as above described, and especially deep cauterization, is *an operation;* and like all operations, surrounded with danger. It must not, therefore, be either injudiciously resorted to, or carelessly carried out. Although my own practice has hitherto been free, or all but free, from serious accidents, the same immunity cannot always be expected. Indeed I recently learned from M. Gendrin, that within the last few years he has had several cases of acute metritis, and of abscess in the lateral ligaments, the evident and immediate result of deep cauterization. But he also tells me he has seen the same results follow the use of nitrate of silver, and of injections; and I may mention that the two most severe instances of acute metritis that I have myself witnessed for some time, in the unimpregnated womb, occurred after the use of weak astringent vaginal injections."

While, therefore, this mode of treatment stands first on the list of remedies, because of its efficiency, it is also the most hazardous if incautiously employed; and requires, on the part of the practitioner, the most watchful attention, both as to the manner of using it, and to its subsequent effects, in order to render it perfectly successful. The caustics used are of various degrees of strength; nitrate of silver, pernitrate of mercury, nitric acid, potassa cum calce, potassa fusa, the actual cautery,—all these have been employed to heal ulcers of the neck of the womb.

"The only caustic," our author observes, "that can be used with ad-

vantage in inflammation of the cervix, without ulceration or hypertrophy, is the nitrate of silver; which acts, however, more as an astringent than as a caustic. The solid nitrate of silver, or a strong solution, should be applied every three, four, or five days, to the inflamed mucous membrane covering the cervix. This is also the mode of treatment to which I have principally recourse, in the first instance, in inflammation of the cavity of the uterine neck, carrying the caustic into the cervical cavity, as far as it will pass."

When inflammation is accompanied with ulceration and hypertrophy, nitrate of silver may still be used; but, in Dr. Bennet's opinion, more powerful cauterization is often necessary.

"Ulceration existing on the cervix uteri, or within the cervical cavity, has a remarkable tendency to perpetuate itself indefinitely, notwithstanding the subdual of all acute or subacute inflammatory action. This tendency is no doubt, increased, by the periodical sanguineous congestion, to which menstruation physiologically exposes the inflamed tissues. Should it not yield (and it seldom does) to antiphlogistic means directed as above, the most efficacious treatment, indeed the only one that can be depended upon, is by direct stimulation of the diseased and ulcerated surface, to modify its vitality in such a manner as to induce a healthy action, and finally cicatrization. This end is obtained by the use of caustics of varied strength, according to the nature and extent of the disease, its chronicity, and the effects obtained. In the application of these two principles resides the entire theory of the treatment of ulcerative inflammation, not only in the neck of the uterus, but in any other part of the economy. We must first subdue acute inflammatory action by emollients, depletion, and astringents; and then modify by direct stimulation the diseased surface, so as to substitute healthy reparative inflammation for morbid ulcerative inflammation."

Such are the principles of cauterization. Nitrate of silver is the least energetic of the caustics; the eschar is superficial, thrown off about the fourth day, and leaving a red, irritable, bleeding surface, which disappears on the fifth, when a more healthy ulceration may be observed. "When a solution of nitrate of silver is used, these effects are obtained in a shorter space of time, and it may consequently be applied at shorter intervals than every fifth or sixth day, the period which should be allowed to elapse between the applications of the solid nitrate." This caustic has also the advantage of greater security, in consequence of its more limited cauterizing power; and so far from doing injury to the surrounding tissues, if it runs on and touches them, it acts on them beneficially as a powerful astringent, if they are at all inflamed. Nitrate of silver applied to the cervix externally causes no pain; but this is not the case when applied to the cavity of the cervix; nevertheless, although painful, it is not by any means so severe as a leech-bite. Nitrate of silver may also be used as subsidiary to the more powerful caustics, which can only be applied at more lengthened intervals—

"To rouse and modify more energetically the vitality of the diseased surface; and it is by the nitrate of silver, that the new action thus created should be moderated and guided. Its occasional employment serves as a dressing to the ulcerated surface, prevents its becoming irri-

table and unhealthy, keeps down granulations, and thus powerfully assists in bringing about cicatrization."

Of the acid-caustics, Dr. Bennet prefers the pernitrate of mercury, but cautions his readers against any carelessness in its application. "I have repeatedly seen," he says, "considerable temporary mischief occasioned by practitioners who were acting under my directions, the caustic having been allowed to run on the cervix and vagina, and thus produce extensive inflammation and ulceration." This is rather an objection to its use, besides that, although more powerful than nitrate of silver, its beneficial effect is still limited; "the ulceration heals to a certain point, and then cicatrization comes to a standstill." A more powerful caustic is therefore necessary, and this is supplied by potassa fusa. The application of potassa fusa to the treatment of intractable ulcerations of the neck of the uterus, and of chronic inflammatory hypertrophy of the cervix, is due to M. Gendrin, the eminent Paris physician; under him Dr. Bennet learned the value of this agent in controlling intractable ulcers. The rapid deliquescence of potassa fusa became, however, as great an objection, if not greater, to its use, than that of pernitrate of mercury. To meet this difficulty the Vienna paste, potassa cum calce, was used; but the mode of its application as a paste was attended with many inconveniences. Dr. Bennet varied in different ways its application; and after much pains has at length succeeded in obtaining a preparation that is as easily and as safely applied as nitrate of silver:

"In the last year or two, however, I have not once used either the Vienna paste or the pure hydrate of potash. I now always substitute cylinders of potassa cum calce, which, with the assistance of Mr. Squire, of Oxford street, I have succeeded in obtaining similar to those of nitrate of silver in ordinary use. M. Fihlos, of Paris, appears to have been the first to discover, some ten or twelve years ago, that it was possible to fuse potassa and lime in variable proportions, and to run the preparation into solid lead tubes. Not finding M. Fihlos's first tubes of fused potass and lime by any means as energetic or as efficacious as the Vienna paste or the hydrate of potass, I long used them only for superficial cauterization. Some time ago, however, having received several from Paris, which were much more powerful, the proportions of potassa being greater,—two of potassa to one of lime,—I requested Mr. Squire to fuse these substances for me in the above proportions, and to run them into soft metal tubes. The fluid potassa invariably melting the tubes, we determined to have iron moulds of various sizes made, and to run it into these. I have thus obtained cylinders of potassa cum calce, which can be used with the greatest ease, and with perfect freedom from risk, owing to their not fusing as pure potassa does, *although quite as powerful in the effects they produce as is the latter substance itself.*"

This improved method of applying this powerful caustic, removes many of the objections to its use, and enables the practitioner to have the full benefit of potassa fusa with considerably diminished risk. Potassa fusa may be used either to modify the vitality of a diseased surface, in which case it is applied only for a few seconds; or to form an eschar of greater or less depth, when it must be applied for a longer time. "Severe cauterization should never be resorted to within less than twelve or

fourteen days of the menstrual epoch, which it often slightly accelerates." The eschar disappears in about fourteen days, and the ulcer heals about the fortieth day; but if not, "the influence of the strong potassa-cauterization being exhausted, it must either be repeated, or the treatment must be carried on with the milder caustics, if it is thought that they alone will suffice."

Dr. Bennet's observations on the treatment of hypertrophy and induration by cauterization are worthy of close attention. He very properly objects to the tedious and inefficient process of treating such a condition of the cervix by local depletions and local applications of iodine and mercurials. Their internal administration is of still less use. "I should myself as soon think of giving mercury and iodine to remove this chronic enlargement of the tonsils, as to remove hypertrophy confined to the neck of the uterus." Such a condition can only be removed by cauterization, which is prompt and efficacious, and which Dr. Bennet has never found to fail. We are happy also to perceive that he cautions his readers against a misinterpretation of his views on this point; a mistake which, we confess, we almost fell into, when we read of the "melting influence of deep cauterization with potassa or the actual cautery." Knowing that it was the practice with some practitioners to use potassa fusa very freely, to reduce the hypertrophied cervix into shape—to melt it down, in fact, pretty much after the manner of a candle-end, with the cautery,—we feared Dr. Bennet was leading us into similar views of treatment, but we very happily found ourselves deceived.

"I wish it," says our author, "to be distinctly understood, that *I do not propose to destroy the hypertrophied cervix* by cauterization, but merely to set up an artificial eliminatory inflammation by means of an eschar or issue, of limited extent, established in the centre of the hypertrophied region. . . . Any attempt to actually destroy the hypertrophy, by direct cauterization, appears to me both dangerous and unnecessary;—dangerous, because I should be afraid that the intensity of the reactional inflammation would be so great, as often to extend to the uterus or to the lateral ligaments; and because I consider it impossible always to limit the action of the caustic when applied with such profusion;—unnecessary, because a mere eschar, the size of a shilling, will equally well answer the purpose of reducing the hypertrophy."—*Brit. and Foreign Medico-Chirurg. Review, Jan.* 1850, *p.* 146.

144.—*On Engorgement of the Uterus.* By M. Recamier.—At the Academy of Medicine, M. Recamier occupied nearly the whole *seance* with a discourse on engorgement of the uterus. As the views of the learned professor on this subject are rather peculiar, and his authority great, the following analysis may be acceptable. M. Recamier holds, that many cases of uterine engorgement are not merely inflammatory, but depend on a certain condition of that organ, which he denominates *erectile.* After having described at some length the erectile condition of the margin of the anus, so frequent in women, and accompanied by so much general disturbance, M. Recamier passed to the same condition

as it affects the neck or mouth of the uterus. It may occur at any period of life, but is most frequent after delivery. The tumefaction produced by the engorged vesssls gives rise to an elasticity quite different from that of inflammation or scirrhus. It is seldom accompanied by fever, though often so considerable that we cannot embrace the os tincæ within the speculum. The neck of the uterus is more or less painful, and discharges of a leucorrheal nature, or even hemorrhage, take place with more or less abundance. These local symptoms are soon attended by general disturbance. The patient labours under a great variety of dyspeptic or gastralgic derangements; nausea and vomiting, palpitations, headache, vertigo, numbness of the limbs, spasms, hysteric symptoms, and secondary inflammations of different kinds. Local hemorrhage soon causes anæmia, and, as the disease advances, vegetations may spring up from the deceased surface, or, in bad constitutions, even carcinoma.

The progress of the disease may be rapid, or it may disappear, to recur under the influence of the causes which originally give rise to it. The constitutional symptoms give way with the local disease, and it is these variations which have given vogue to so many modes of treatment. Thus, in some cases, cauterization, or emollients, or calmants, or derivatives, may succeed at a moment when other modes had failed; but this success should only teach us the necessity of being *apropos* in everything.

Erectile engorgement of the uterus, like the analogous disease of the rectum, is often chronic, and the patient remains in a cachectic state of suffering until relieved by art. The means of relief are various, and by turns successful; emollients and calmants in the drink; as liniments, injections, &c., together with rest and a proper regimen.

Local cauterization.

Revulsives to the groins or loins.

Tonics and preparations of iron. Excision; ligature.

For cauterization, M. Recamier prefers the nitrate of silver to the acid nitrate of mercury, because the former produces a drier eschar, and gives less pain. The solid caustic of Filhos presents many advantages; but we should reserve it for cases requiring great destruction of parts. Many precautions are necessary during the use of this powerful caustic.

The ligature is required for fungous vegetations springing by a pedicle from a healthy surface. The ligature should always be tightened *gradually* to avoid the danger of peritonitis, which M. Recamier has seen produced by the opposite practice; or the vegetations may be removed by torsion, with a polypus forceps.

After having cited a great number of cases in support of the preceding doctrines, M. Recamier terminated his interesting lecture—for such it really was—by the following conclusions:—

1. There are certain engorgements of the uterus capable of being resolved, which are neither inflammatory nor connected with hypertrophy, scirrhus, tubercle, or fibrous tumours, but depend on elastic tumours, and ordinarily bleed as soon as the epithelium which covers them gives way.

2. These engorgements follow the same course as the analogous disease of the rectum.

3. They are of frequent occurrence; and when they have been established, never cease until *all* the erectile capillaries which compose them have been destroyed.—*Med. Times, Feb.* 16, 1850, *p.* 117.

145.—*On the Origin of Uterine Disease from Ovarian Excitement.* By Dr. E. J. TILT, Physician to the Farringdon General Dispensary.—The liability of the neck of the womb to disease, under the influence of ovarian irritation, will be better understood, if we consider its anatomical structure. The neck of the uterus is said to be constituted of muscular fibres, cellular tissue, and an external and an internal mucous membrane; but there is another and very important element of its structure, which has been overlooked even in our best and most recent works on this subject,—I mean the *erectile tissue*, which also enters into its composition. Dr. Eugene Forget has lately asserted that the erectile tissue (a continuation of that which lines the vagina), exists in the normal cervix; and that, as it forms a covering for the extremity of the penis, so it covers the surgical extremity of the neck of the womb.* It is evident, that the various stimuli to which this organ is liable, will exaggerate the condition of the normal structure which I have described, and thus give rise to those swellings, which are by some called inflammation, by others, engorgement; and which have been long since termed *erectile* tumours of the cervix uteri, by Prof. Recamier. The correctness of this denomination will be evident, when we consider that these swellings are at first, and often for a long time, of an indolent, spongy, vascular nature, and only inflame when, from the increased effect of irritating causes, their epithelial surface becomes abraded. The immediate therapeutical bearings of the erectile tissue, as one of the elements of the neck of the uterus, are important.—*London Journal, April* 1850, *p.* 349.

146.—*Case of Hydatids of the Uterus.* By Dr. P. B. HISLOP, Govan.—Mrs. A., aged 26, a lady of fair complexion and delicate frame, the mother of several healthy children.

For several months prior to this date, September, 1847, she has been losing flesh, and much annoyed with a profuse leucorrhœal discharge, which tonics and astringent injections have failed to arrest,—has menstruated regularly, but profusely, till four months ago, when suppression of the function took place, and in its stead, frequent discharges of clotted blood

* Dr. Snow Beck denies the presence of any erectile tissue in the neck of the womb; and his intimate acquaintance with the structure of this organ gives weight to his assertion I have, however, consulted our great microscopical authority, Mr. Quekett, who admits the existence of a layer of erectile tissue covering the neck of the uterus He says that it is of a similar structure to that of the penis, and to that which lines the vagina.

or bloody serum have occurred at irregular intervals, and occasionally in rather profuse and exhausting quantities. She complains of frequent paroxysms of sickness, faintness, and feeling of exhaustion,—straitness and sense of weight across the chest, together with palpitation of the heart, loss of appetite and borborygmi—dragging pains in the back and loins, and feebleness of the lower extremities.

Above the pubis there can be readily felt, and accurately defined, a circumscribed swelling of the size of a well-developed uterus immediately after delivery; solid, but not painful to the touch; of a regular and globular shape, and rather mobile. This tumour has only recently attracted the notice of the patient, and she fancies it varies in size from time to time. On examination per vaginam, the uterine orifice appeared *quite closed*, and no effort to introduce the finger was successful. The tumour in utero could be readily felt through the vaginal walls.

Patient assures me it is *impossible* she can be pregnant.

Failing, after the lapse of several weeks, to obtain any relief of the symptoms, and especially of the severe sanguineous discharge, from the use of mineral acids—the recumbent posture—gallic acid—iodine injections—plugging the vagina, and even ergot of rye, I resolved to take advantage of one of the capricious intervals of a cessation of the hemorrhage, to artificially dilate the os uteri, and make a manual examination of the uterine cavity, remove the cause of irritation, and endeavour to bring about a healthy state of the utero-vaginal mucous membrane.

With this design, I prepared a series of sponge-tents, and taking one of a very small diameter, I, after no small difficulty, in consequence of a slight twist in the os uteri, in the direction of the sacrum, succeeded in introducing it partially within the orifice. This I repeated every twelve hours, each time employing a tent of increased diameter, causing in the first instance, a considerable aggravation in the amount and fætor of the sanguineous discharge, as well as some slight periodical pains.

At the termination of the fifth day I had accomplished the complete dilatation of the os uteri, bringing into view, through the speculum, a bulky bloody-tinged body, hanging pendulous from some part of the superior surface of the uterine cavity.

Having previously at intervals administered two cupfuls of a pretty strong infusion of ergot, I introduced my hand into the uterus on the 11th of October, and, guided by the morbid mass itself, sought its most elevated attachment, and cautiously detached it from the mucous surface of the uterus. This I repeated until I conceived I had removed the entire bulk from the uterus, which thereafter slowly, though *sparingly*, contracted on my hand, and on the following day could scarcely be felt.

A considerable hemorrhage took place both during and subsequent to the operation, which, from the debilitated and exhausted state of the patient, it was exceedingly desirable to obviate. I directed cold water cloths and warm flannel alternately, to be applied locally. Repeated doses of the infus. secal. cornut. during the day and subsequent night, and five-grain doses of gallic acid administered thrice a-day, were continued for upwards of a fortnight, when the coloured discharge had nearly ceased. Under this treatment, and a generous diet, she recovered slowly.

The masses removed in this case were very similar to those expelled in the first case,—a series of stringy bodies, like the fibrinous portion of a clot of blood, covered internally and externally with hosts of large and small hydatids.—*Monthly Journal, April*, 1850, *p.* 327.

147.—*On the Diagnosis of Ovarian Dropsy.* By I. B. Brown, Esq.—[In a paper read before the Westminster Medical Society, Mr. Brown gave the following excellent account of the symptoms and diagnosis of ovarian dropsy. After referring to the peculiar expression of countenance which patients in this disease exhibit, and mentioning the little disturbance there is of digestion, respiration, or the heart's action, as compared with what occurs in ascites, Mr. Brown proceeds to say:]

The special signs are —First, we can generally trace the commencement of this disease from one of the ovaries deep down in the iliac fossa; a tumour pressing between the rectum and the vagina may be felt, either through the walls of the vagina or the rectum, not excessively painful, but elastic; on firmly pressing it, especially if at the commencement of the formation of the tumour, you can get it between the thumb in the rectum, and the middle finger in the vagina; but you can also frequently feel an egg-like enlargement around the ovary, through the abdominal parietes, especially if you flex the thighs on the abdomen, so as to relax the muscles. This tumour gradually and definitely increases, still maintaining a rounded outline, and ascends from the pelvic cavity to the abdominal, and rises in the front of the bowels, distending the abdominal parietes, and sometimes reaches the ensiform cartilage, pressing up the liver, stomach, pancreas, and spleen, so as to elevate the diaphragm, and thus contract very considerably the thoracic space. This tumour, which, as it ascends, becomes more fluctuating, occupies the side from which it originates; but whilst it throughout retains a preponderance towards that side, it gradually extends to the opposite. The veins of the abdomen are generally much increased in number and size. The sac containing the fluid being circumscribed, the indications afforded by percussion are also circumscribed, and the sounds on percussion are of course dull over the sac and resonant over the surrounding intestines. On examination per vaginam, fluctuation can be generally felt through its walls, and the vagina itself is elongated and drawn up, sometimes even under the arch of the pubis; the uterus is also either drawn up or pressed back on the rectum; the cyst is generally round and smooth on feeling it through the parietes of the abdomen, and moveable from side to side, and is not materially altered by change of position, either recumbent or upright. These special signs apply more particularly to unilocular ovarian dropsy. In multilocular, we almost invariably have an uneven and irregular surface of the cyst, and generally one or more solid tumours, which appear inelastic and without fluid; but in very many cases these tumours will be found to be additional cysts, containing fluid, tense, owing to the pressure of the fluid in the larger one. Mr. Brown had frequently found this to be the case; and this was proved by evacuating the contents of the larger cyst, and again introducing the trocar through

the canula still in the opening, thrusting it into the apparently solid tumour, and finding immediately an escape of fluid. On examining a multilocular cyst, fluctuation is not very distinct, if you examine the entire cyst; but if you tap over any one of the sacs, fluctuation is apparent, but only over that one, not being at all communicated to the adjoining cyst or cysts; where, however, the fluid is gelatinous or albuminous, fluctuation cannot be so readily felt. The same observation applies to those cases containing thick, cheesy matter, mixed with pus, and sometimes also with hair. But we have also distinct solid tumours in connexion with these fluid ones; and then there is no sense of fluctuation. This observation applies both before and after evacuating the contents of the fluid cysts. Having ascertained the nature of the tumour, so far as to say whether it is unilocular or multilocular, the next important subject is as to the presence of adhesions. In examining for adhesions, Mr. Brown directed that the patient should be laid in the horizontal posture, and be made to flex the thighs on the abdomen so as to relax the abdominal parietes; he then moved the cyst from side to side. If this were readily done, he knew there were no adhesions. Again, he placed his hand firmly on the relaxed parietes, and moved them over the cyst. If they moved readily, he knew there were no adhesions on the upper and lateral surfaces of the cyst. Again, as the parietes are thin in this disease, he grasped and puckered them up, and then moved them over the cyst, and also saw if they gathered up readily, without raising the cyst itself. If he found these three indications, Mr. Brown determined that there were no adhesions. Another plan, for which he was indebted to his friend, Dr. Sibson, is based on the extent to which the contents of the abdomen are forced downwards during a deep inspiration, by the descent of the diaphragm. If there be no adhesions in front, the upper boundary of the ovarian tumour descends to the extent of an inch during a deep inspiration, the place previously occupied by the tumour being now taken up by the intestines; consequently, if you percuss over the upper part of the tumour, a dull sound is elicited during ordinary respiration; but when the patient takes a deep inspiration, an intestinal resonance is there perceptible. Mr. Brown then alluded to those diseases which may be mistaken for ovarian dropsy, and slightly remarked on their peculiar signs. They were—1st, retroflexion and retroversion of the uterus; 2ndly, tumours of the uterus; 3rdly, cystic tumours of the abdomen; 4thly, ascites; 5thly, pregnancy; 6thly, distended bladder; 7thly, distended bowels from flatus; 8thly, fæces in the intestines; 9thly, diseased viscera of the abdomen.—*Lancet, Dec.* 1. 1849, *p.* 586.

148.—*New Operation for Ovarian Disease.* By I. B. BROWN, Esq.—[At a recent meeting of the Westminster Medical Society, Mr. Brown gave an account of a new operation which he had performed for Ovarian disease.]

He observed that this operation differed materially from Mr. Bainbridge's, inasmuch as that performed by him required the patient to be in the prone posture for many months; whereas this enabled the patient

to be on her back, on water cushions, which added very greatly to her comfort, and also enabled the nurse to dress and clean the wounds without fatigue or annoyance to the patient, as well as enabled the surgeon to apply pressure over the cyst, by placing strips of plaster from the opposite side of the abdomen, and bringing them firmly over beyond the incision and open wound. He placed the patient on the edge of the bed, in the horizontal posture, and then drawing an imaginary line from the umbilicus to the superior spinous process of the ilium, and dividing it into thirds, he made an oblique incision from above downwards, and from within outwards, through part of the middle third and into the outer third.

The oblique incision was about three inches. He dissected carefully through the muscles and fascia down to the peritoneum; through this could be seen the whitish shining coat of the cyst: he then made another smaller incision at right angles to the first, and dissected down to the peritoneum; this incision was about an inch and a half in length. At the point of the angle a large-sized trocar was introduced, and the fluid drawn off. The canula being kept in, the peritoneum was divided, and reflected back; then the cyst was stitched by sutures to the aponeurotic tendon of the external abdominal oblique muscle, carefully avoiding the other structures; these sutures were nine in number, and were so arranged as to secure completely the cyst on all sides to the tendon of the muscle, and prevent any escape of the fluid from the cyst into the peritoneal cavity; the canula was now withdrawn, and by means of a pair of scissors the cyst was divided between the sutures; a pledget of lint, soaked in oil, was then introduced into the wound, and changed occasionally, and some adhesive straps placed across the abdomen, to keep up gentle pressure. Not a single bad symptom, referrible to the operation, followed. The second operation was performed in a similar manner, and in the same position, but a piece of the cyst was cut out, the fluid being first evacuated, and then the remaining portion of the cyst was allowed to return to the peritoneal cavity, the external wound being closed; pressure was applied over the whole abdomen by means of adhesive strapping and flannel bandage. This operation was intended to imitate spontaneous rupture.—*Med. Gazette, Feb.* 8, 1850, *p.* 249.

149.—*On a Method of Plugging the Vagina with a Caoutchouc Bladder.* By M. Diday.—M. Diday, having a case of *metrorrhagia*, in which the patient had become reduced to almost the lowest point of exhaustion, resolved to avail himself of one of Dr. Gariel's ingenious applications of vulcanized caoutchouc. The apparatus consists of a small bladder of caoutchouc, to which is attached a long tube. Rolled up so as not to exceed the little finger in size, it was passed as deeply into the vagina as possible, and kept there by the end of the finger; it was then inflated through the tube, until the small body, which had been introduced almost imperceptibly, acquired a volume constituting a sphere of about 33 centimetres in diameter. The air was retained by tying the tube. No means of retaining it *in situ* were required, and the hemorrhage entirely ceasing, it was removed, sixty-four hours after, as

easily as introduced, by allowing the air to escape through the tube. Any one who is aware of the pain and uncertainty attending the ordinary mode of plugging the vagina, must agree with M. Diday that this is a most useful apparatus. Its advantages consist, he adds—1. In its simplicity, and the rapidity with which it may be employed. Thus, it only weighs about half an ounce, is soft and flexible, admitting of being put in the instrument-case, and is applied in a few seconds. 2. It causes no pain either during or after its application, and requires no bandage to retain it. 3. It admits, before insufflation, of being moulded on the parts to be compressed, and thus can exert compression upon a cavity, however irregular in form. 4. It allows of any degree of diminution or increase of pressure to be made, according to the exigencies of the case. 5. It is impermeable to, and incorruptible by, whatever discharges it comes into contact with, and never loses its elasticity. 6. Distended only to a third or fourth of its natural extensibility, it is just as smooth, and possesses nearly as great a resisting power, as when fully distended. 7. A somewhat larger apparatus would be available for plugging the cavity of the uterus itself, in hemorrhage after delivery. Moulded on the inner surface of that organ during its state of inertia, as this became recovered from, the air would be gradually let out, and the size of the compressing vessel diminished *pari passu* with that of the uterine cavity.

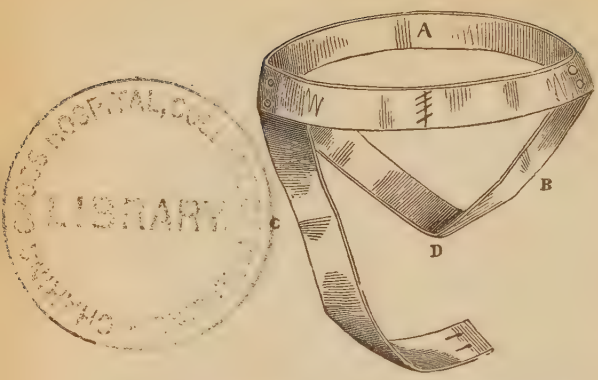
Dr. Gariel has availed himself of the remarkable properties of the vulcanized caoutchouc (its unalterability by corrosives, its preservation of elasticity at all temperatures, its great strength, and its resumption of its original size after however great extension) for the construction of a vast variety of surgical apparatus, some of which exhibit great ingenuity. Thus there are bandages, means for making extension and counter-extension, means of exerting compression from within, as in stricture of the urethra, plugging the nares, plugging the vagina, pessaries, or from without, as in hernia, and other pads. One of the most simple of these is a portable urinal, which is of such a trifling size and weight, as to cause no inconvenience or ill appearance. The penis is adapted to the orifice of this just as the wrist is to the India-rubber band of a glove, and, the material being impermeable, no smell issues. When opportunity offers, without displacing the vessel, the patient discharges the collected urine by means of a little cock attached to it. ('Gaz. des Hôpitaux;' 'Gaz. Méd.')—*Brit. and For. Review, Jan.*, 1850, *p.* 269.

150.—NEW BANDAGE FOR PROLAPSUS UTERI.

By T. W. Nunn, Esq., Surgeon to the Western Dispensary.

The diagram accompanying this communication is intended to be illustrative of a peculiar perineal bandage* which has been found useful in the treatment of prolapsus of the uterus. Its especial purpose is to enable the surgeon to afford support, or apply pressure to the soft parts forming the floor of the pelvis, according to the circumstances of the case.

* Can be obtained of Mesdames Bell, 63, Margaret-street, Cavendish-square.



A is a belt encircling the waist; *B* is a band attached obliquely to that point of the waist-belt which corresponds to the right hip, and is supposed to have passed between the legs, and to have been fixed on the corresponding point of the left hip by buttons or other means. *C* is another band exactly similar, having an opposite course, and an opposite attachment, that is to say, fixed to left hip, and after passing between the legs, fixed on the right one. The end which is intended to button is represented *free*, in order to render the diagram more easy to be understood; but it is not difficult to perceive that the two bands when properly adjusted will cross each other at the point *D*, or thereabouts. The bands must be attached to the waist-belt with such a degree of obliquity as will allow of their lying evenly in the corresponding groin when adjusted. The waist-belt can be more or less shaped to the figure, as may be found most comfortable; but it is almost impossible to give precise instruction as to the exact form of every part, on account of the great diversity in the formation of the pelvis in different individuals. Sometimes it will be found requisite to make the bands *B* and *C* narrower at the point of crossing than at any other part—at other times this will be found unnecessary.

To insure satisfactory results from the adoption of this bandage, care must be taken to make every part fit exactly, and it is by attention to this point that the comfort of the patient is secured. In certain cases it may be found advisable to interpose a pad between the perineum and the bandage—this can be so easily effected that I deem it hardly requisite to offer any directions concerning it.

The advantage that this particular arrangement has over any of the other different modifications of the T bandage, is this—namely, it offers a perfectly steady unvarying amount of support—the tension upon its various parts being quite unaffected by the movements of the trunk. The reason of its possessing this advantage will be apparent, when it is taken into consideration that whilst the pressure is being made at the perineum, the *points d'appui* are at the margin of the ilium, and that, therefore, the distance between the point of pressure and the points of tension can neither increase nor diminish.—*Lancet, April* 6, 1850, *p.* 406.

[In a subsequent number of 'The Lancet,' Dr. G. P. May, of Maldon, states that the bandage above described has been used for some time by Dr. Blundell.]—*Lancet, April* 13, 1850, *p.* 468.

151.—*New Uterine Supporter.*—[Mr. P. Magenniss recommends an instrument consisting of a small pessary supported upon a firm but flexible wire stem, which is attached to a frame of wire passing in front and behind, but so contrived as not to press upon the external parts and not to interfere with the evacuations. Straps pass up from the end of the frame in front and behind, and retain the whole in position by their attachment to shoulder straps, or to an abdominal belt.]—*Lancet, Dec. 22, 1849, p. 661.*

152.—*New Uterine Scarificator.*—[At a meeting of the Westminster Medical Society, a few months ago,]

Dr. Routh exhibited three uterine scarificators, made by Mr. Coxeter, of Grafton-street. Two of these, he remarked, were of little practical utility. Of the third he believed he was the inventor, though it was founded on the principle of other instruments used abroad. It was to this instrument he wished, therefore, to call the attention of the society. It consisted of an external metallic case or tube, one end of which was dilated, to receive four lancets, concentrically arranged. The lancets were fastened upon a steel rod, which passed through the tube to the opposite side, connected within the case with a spiral spring, the effect of which was to keep the lancets, when in a state of rest, within the dilated part of the tube. The end of the steel rod projecting on the opposite side was terminated by a circular disc, between which and the tube was another little steel disc, playing on a screw, by which the projection of the lancets might be graduated. The difficulty was in keeping the lancets clean. This, however, was greatly facilitated by a peculiar arrangement in the central rod, which was so made as to unscrew in two parts, about two-thirds down the tube; and in this manner the upper portion could be drawn out and cleaned; while in like manner the tube, by the passing of a piece of lint within it, could be wiped. The quantity of blood, however, that penetrated down the tube was very trifling. In the application of the instrument, a speculum was first used, to bring the os and cervix in view; and the instrument, being passed up through the speculum, was thus brought in contact with the uterus. The slightest pressure now upwards of the disc caused the lancets to penetrate into the substance of the cervix; while the spring, on the removal of this pressure, caused the lancets to return into the dilated tube; and in this manner, by the alternate movement, the cervix uteri could be punctured *ad libitum*, and to any depth. Now, congestion of the os, with all its disagreeable consequences, and prolonged cervix, causing vaginal irritation, metritis, &c., were very common affections. In these cases, he (Dr. Routh) was in the habit of first puncturing freely the cervix; but in prolonged cervix, where more hemorrhage and absorption of substance was required, in addition to the puncturing of the cervix, by turning the disc from left to right, he was enabled to cut it up in little portions. Then, by applying a solution of nitrate of silver (from twenty grains to one drachm to the ounce), much hemorrhage and great absorptive action was set up in the part, and the disease removed effectually. The use

of leeches in the ordinary way, or caustic, were both tedious processes, and usually the former was especially disagreeable to a patient. With this instrument the cure was very speedy and effective. A prolonged cervix of from two to three inches could be cured in two weeks by two or three scarifications. Under these circumstances, he ventured to hope the instrument would be found useful, in the hands of the profession, for the treatment of uterine diseases. One caution, however, he thought proper to add—it was always well to follow the scarification by a brisk purgative.—*Med. Gazette, Jan.* 4, 1850, *p.* 34.

153.—ON THE USES OF OPIUM IN MIDWIFERY.

By Dr. J. C. W. Lever.

[Speaking first of the uses of opium in threatened abortion, Dr Lever says:]

In the management of cases of threatened abortion, it is my rule, if possible, to get a thorough knowledge of the immediate or exciting cause of the hæmorrhage or pain, or both; secondly, before using opium, to ascertain the state of the os uteri, and especially whether the anterior part of the neck has lost its plumpness and firmness, and has become soft and baggy. If with the discharge we have a patent state of the os uteri, and if the neck be soft and loose, the exhibition of opium will do harm, by retarding the emptying of the uterus, which must sooner or later take place. But while I do not advocate the use of this drug under the circumstances related, I can speak loudly in its praise after the abortion has occurred, especially if such have been attended with a large loss of blood: it will allay excitement, tranquillize the circulation, and procure sleep. These remarks, however, do not altogether apply to those cases which menace from accident, or from mental causes, or those which may be said to be due to habit. In these, with the application of cold, perfect quietude, and unstimulating diet, I have known the exhibition of opium by mouth—or, what I prefer, a cold starch injection, with opium thrown into the bowel, and repeated every night or more often, according to existing circumstances—followed by the best results.

But the value of opium is still more clearly exhibited when it is administered to alleviate those pains which precede the establishment of labour in the latter weeks or months of gestation. Many a patient, by its agency has been carried on to the full end of her term, who but for it would have prematurely parted with her offspring. I had a lady under my care who, six weeks from the completion of her full term, fell on her back. The liquor amnii was evacuated. In addition to absolute quietude, she took opium at irregular intervals till the end of the ninth month, when a living child was born; and this to me was the more satisfactory as she had on two previous occasions been prematurely confined, although opium had been administered, but with a sparing hand.

Further, we find this drug of great value in certain varieties of natural labour. For instance, at the commencement there may be irregular and spasmodic pains. They are recognised by their acuteness,

by the want of consentaneous action in the uterine fibres; some portion of the uterus during their continuance is hard and contracted, the other portion is soft and yielding; there is no distinct or regular interval of time between the occurrence of pain; and, if untreated or unrelieved, the strength of the patient is exhausted before the establishment of true labour pains; or the child, which at the commencement presented normally with the head, has its position changed to that of the shoulder, by reason of the uterus contracting on one side and forcing its contents over to the uncontracting or yielding side. In such a case the utility and value of opium is most marked. It may be exhibited by mouth or *per anum*. It will calm the spasm, subdue irregular action, alleviate pain, procure sleep; and after this, true and regular uterine action will be established. Manifold are the instances of its value I have witnessed in such cases.

Not unfrequently in women who marry late in life, and in those who marry very young, do we find the liquor amnii pass away very early,—in fact, before the os uteri has commenced to dilate: this may occur spontaneously, or be the result of violence. At all times this is to be regretted; for, in addition to our losing the efficiency of the bag of water to prepare the way for the passage of the child, the fœtus is brought into close contact with the uterus, which is therefore more strongly stimulated; the head is brought into direct contact with the os internum, the most sensitive part of the uterus; the labour is more painful, and the birth of a living child is rendered more doubtful. Here the cautious and judicious exhibition of opium controls hyper-uterine action, alleviates pain, and gives a better security for the welfare of the child.

Again, in practice we find women who have suffered in early or unmarried life from one of the forms of dysmenorrhœa, when pregnant and in labour, with the os uteri thin, sharp, knife-like, so that its edge is scarcely to be felt,—in fact, is often overlooked by the unpractised finger. The sufferings of the patient are intense: the dilating stage of labour is protracted; and, if untreated or unrelieved, by the time the os uteri is dilated nature is exhausted, uterine effort fails, and such a case is frequently terminated either by the forceps or by craniotomy. In most cases these evils may be averted by the timely employment of opium, and the best mode of securing its good office is in the form of enema.

Further, we occasionally find the first stage of labour rendered tedious by a hardened undilatable condition of the os uteri in women who have suffered from chronic inflammation of the neck of the uterus, or those who have worn mechanical contrivances for the purpose of supporting the viscus, and in those who, from disease imaginary or real, have been submitted to the influence of some escharotic at the present day by far too commonly practised. This condition of the os uteri needs no description: the sufferings of the patient are excessive and protracted, and, if unrelieved, may be followed by results serious to mother and fatal to child. In addition to blood-letting, applicable to some cases; to the warm bath, of immense value; to the exhibition of antimony, and this is of the greatest service; we find that when the latter has been exhibited, and has produced its desired results, relaxation of the os uteri, and increase of discharge, that

opium given in a full dose will render such permanent, and thus prove a most valuable agent in completing a safe delivery. Opium has been recommended most strongly in cases where the os uteri is callous; but if the callosity depends upon previous injury, or is the result of disease, its value, in my opinion, depends upon its power to curb uterine action until vaginal interference removes the obstruction to the passage of the fœtus. But there is another condition of the os uteri in which opium acts, and like a charm: in women who have suffered from irritable uterus where the vagina is generally dry and hot, although not over sensitive; but the moment the examining finger touches the os uteri, the patient shrieks out, shrinks from the attendant, and by her cries and motions proves the suffering she endures. In addition to subsidiary measures, as the warm bath, the injection of linseed-tea into the vagina, great benefit is to be derived from the use of opium, either by the mouth or by the rectum; the latter mode of employment is the one I prefer. Further, in cases of transverse presentation where it is necessary manually to interfere to bring the long axis of the child to correspond with the long axis of the uterus, we may assist in relaxing the os uteri, and abate uterine contraction, by the exhibition of a full opiate, but I am no advocate for repeated doses. By such treatment the patient becomes narcotized, uterine efforts arrested, and at the time we need contraction to complete the delivery and prevent hemorrhage, nature fails, and our patient is placed in a situation of extreme peril.

Again, in convulsions, especially those of the hysterical form, occurring as they do more frequently during pregnancy than during labour, opium is a valuable remedy. This form of convulsions, evidencing itself as it does most frequently during gestation, is readily recognised by the predisposition of the patient, often induced by over-fatigue, mental anxiety, irregularity in diet, &c., preceded by intolerance of noise, sleep short and interrupted, twitchings, startings, copious flow of limpid urine, oppression at the chest, difficulty of breathing, globus, pain at the upper part or back of the head; and when the convulsions manifest themselves the larger muscles are more often affected than the smaller; here we find after the paroxysm is over that a mild opiate soothes the patient, allays the twitching, calms the respiration, and procures sound and refreshing sleep.

Secondly, in the anemic form of convulsions, associated as they not unfrequently are with large losses of blood, where the face is pale, the eyes glazy, the features shrunken, the countenance betokening exhaustion, the lips colourless, the skin cool, the chest heaving, the breathing laboured, the pulse small, quick, and irritable, with noise in the ears, and pain or weight at the top of the head, where there is sleeplessness or restlessness, partial amaurosis, strabismus, and sometimes delirium; while close attention is paid to the position of the patient, especially to the position of the head; while stimulants are administered with judgment; while the contraction of the uterus is secured, opium will be found to act like a charm. Again, in genuine eclampsia, where vascular excitement and relaxation of the soft parts have been accomplished by bleeding, purgation, and tartarised antimony, and where the repetition of the fits seems to depend upon irritation, I have seen them occasionally checked by the administration of a full opiate. Labour also may be complicated with

tumour; here opium will allay inordinate action until we employ those manual or surgical means which are necessary to remove the obstructing cause to delivery. It is true opium cannot take away the mechanical obstacle, but it may and will lessen inordinate uterine action; for in practice we find that if there be any difficulty in the passage of the child the uterus is stimulated to undue action, and if such be not allayed, or be overlooked, rupture of the viscus itself may take place. This leads me speak of the efficacy of opium in the treatment of those grave cases where the uterus or vagina is lacerated, or the bladder or diaphragm have ruptured. The two latter lesions are indeed to be regarded as all but hopeless; but not the former, for I have seen cases treated by the administration of full doses of opium, and then repeated at varying intervals for several days, and then terminating successfully. To one woman I was called when there was a band in the vagina, the result of a previous delivery; in this case the laceration was so extensive that the hand could be passed into the abdomen. Although the patient appeared to be dying, although the last rites of her Church were administered to her, she rallied, recovered, and is still alive. Soon after her convalescence she had the ill fortune to lose her husband, but she also had the good fortune not again to be pregnant. But the value of opium is perhaps most emphatically demonstrated when exhibited after floodings, whether such occur in the earlier months of gestation, or in the latter, depending either upon the position of the placenta or its partial separation, whether the loss take place after the birth of the child and the casting or throwing off the placenta; whether this be retained by irregular contraction or morbid adhesion; or whether the hemorrhage take place after the complete evacuation of the uterus. In these cases, where there is great exhaustion, alarming syncope, great irritability, severe vomiting, and plain, evident, and undeniable indications of great depression of the sanguiferous and nervous systems, or to use the graphic language of Dr. W. Griffin, "When the countenance is sunk, the eye hollow and glassy, the lips blanched, the skin cold, and the whole person corpse-like; when the pulse is all but gone at the wrist; when the beat of the heart is scarcely perceptible, and stimulants, even brandy, are vomited or useless, opium will act like magic, and save the patient from an untimely grave: but to do good it must be exhibited in full doses of one to two drachms of the tincture, or three to four grains, repeating two grains every half hour or hour until the pulse becomes distinct, the breathing calm, and the jactitation allayed." Whatever may be the "ratio medendi," whether the congestion produced in the brain be what is necessary to maintain the proper tension of the cerebral vessels, whether it restore the loss of nervous power in the brain itself, is still a point "sub judice;" but no man of much obstetric experience will deny its value under the circumstances thus detailed. I could illustrate its efficiency by the recital of several cases of success where a patient appeared to be on the very confines of eternity; and in the subsequent constitutional treatment its exhibition must not be forgotten: it will lessen exhaustion, diminish restlessness, allay vomiting, calm gloomy forebodings, and procure sleep.—*Med. Gazette, Nov.* 23, 1849, *p.* 902.

154.—*Case in which Premature Labour was induced by the Uterine Douche.* By Dr. O. Naegele.—Premature labour had, on two former occasions, been induced, in the subject of this case, with successful results, by means of the sponge-tent; but, on the first occasion, eighteen, and, on the second, seventeen days were required to accomplish it. Dr. Naegelé, therefore, on the present occasion, resolved to put into force the means proposed by Kirnsch, and simplified by Cohen. The termination of the labour was expected on the 15th of September, and he commenced the attempt to anticipate it on the 2nd of August. The patient sat on a stool, with the upper part of her body bent somewhat backwards, the nozzle of a syringe containing 11 oz. of water at 27 R., was passed half an inch within the os uteri; and the water injected with considerable force eight times in succession. In the evening the injection was repeated seventeen times. She slept well, and, early on the 3rd, labour-pains having commenced, she was syringed other ten times. In the afternoon, the pains had become stronger and regular, and the os uteri was sufficiently open to allow of the child's head being felt. Seven more injections were employed, the pains still increased in severity during the night, and, on the morning of the 4th, a living child was born, i. e., only forty-six hours after the first syringing. The placenta soon followed, and she did well. ('Medicin. Zeitung,' No. 36.)—*Brit. and For. Medico-Chirurg. Review, Jan.* 1850, *p.* 269.

155.—*On the Prophylactic Treatment of Habitual Disposition to Abortion.* By Dr. Metsch.—When the disposition to abortion is dependent upon a diminished vitality of the uterine system or functional weakness of its nutritive vessels, Dr. Metsch says that medicines of a stimulant and strengthening description, acting powerfully upon the circulation of the organ, are indicated, and of all such substances *savine* is that which is most to be relied upon for this end. Of course so powerful a drug requires skilful selection of appropriate cases for its employment, or it may give rise to hyperæmia of the pelvic and abdominal organs, inducing hemorrhage, inflammation, abortion, or death itself. Local or general plethora, or serious disease of any part contraindicate its use. An infusion is made by adding from two to four drachms to six ounces of boiling water, a spoonful being given morning and afternoon during the intervals between the menstrual periods. On several occasions, before commencing with it, catarrhal or gastric disturbances have to be allayed, as also irritation dependent upon congestion, rheumatism, or disorder of the nervous system. Small general or local bleedings, emetics, aperients, tepid baths, or friction of the surface are required in different cases. So too regulation of diet, abstinence from sexual excitement, rest in the horizontal position as long as pain is present, are then indicated.

If the disposition to abortion depends upon an augmented irritability and contractility, (a condition not always opposed to the first named), the savine does not alone suffice, but a medicine is required that exerts a special effect in regularizing uterine irritability, the *ergot of rye*, which

should be added to the savine infusion in the proportion of one to two, when former miscarriages were induced by the primary contraction of the womb without preliminary hemorrhage. Another modification in the prophylaxis is to be made when former abortions were attended with great urinary irritation, in which case six drops of *tr. lyttæ* should be added to each dose. When, prior to former abortions, there was great disturbance of the digestive organs, very small doses of *ipecac.* may be alternated with the above.

The savine has also been found useful in various chronic diseases of the female genital organs, connected with vascular and secretory torpor, especially in passive hemorrhages and leucorrhœa. In the same way it is of good service, conjoined with mechanical means, in treating prolapsus uteri consequent on frequent or difficult labours and abortions.—('Zeitschrift für Geburtkunde.')

(Dr. Metsch speaks with great confidence of the great utility of savine, and relates some cases in proof; but it is obvious that such powerful medicines as savine and ergot require great discrimination in selecting appropriate cases. In these annoying cases of repeated miscarriage, occurring in women of weak and irritable fibre, and unaccompanied by vascular congestion, we have derived remarkable benefit from the administration of *assafœtida* as soon as a new pregnancy has manifested itself, and in the manner recommended by Dr. Laflerla of Malta. Ed.) - *Brit. and For. Review, April* 1850, *p.* 548.

156.—ON THE "OVULAR THEORY" OF MENSTRUATION.

By W. B. Kesteven, Esq.

[Mr. Kesteven's observations are directed to an examination of the grounds upon which rests the "ovular theory" of menstruation now so popular, —and not merely popular, but supported by high names, among which Mr. Kesteven mentions those of Drs. Power, Robert Lee, Meigs, Tyler Smith, and Kirkes.]

The ovular theory has been expressed in the following propositions:—

1. Previously to the period of puberty, the ovaria do not contain mature ova.

2. It is only at, and after the period of puberty, that ova are matured in the Graafian vesicles of the ovaries.

3. The maturation and discharge of ova occur periodically, *i.e.* at the time of menstruation.

4. The maturation and discharge of ova cease with the cessation of the catamenia.

5. The augmentation of the activity of the ovaria at these monthly periods is extended to the uterus, and produces the menstrual flow.

6. The menstrual flow is a secretion, the analogue of the decidua—"an abortive attempt to place the uterus in a position to receive and attach the ovum to its surface."

These propositions embrace the cardinal points of the ovular theory of menstruation. We propose, therefore, to examine them in detail.

Proposition 1.—"Previously to the period of puberty the ovaria do not contain mature ova."

On this remark, there exists no series of investigations, instituted with express reference to the ovular theory of menstruation, that can in any degree compete with the researches of Dr. Ritchie, as related in Vols. 33, 34, 35, of the 'London Medical Gazette.' On consulting these, we find the author recording the results of necroscopic examinations of the bodies of children of various ages, up to the period of menstruation, in the following words:—

"The ovaries of new-born infants and children are occupied, sometimes numerously, by Graafian vesicles or ovisacs, which are highly vascular as early as the sixth year, and vary in size from the bulk of a coriander seed to that of a small raisin, in the fourteenth year; at which time, also, they are filled with their usual transparent granular fluid; their contained ova can be detected, and their coats are so elastic, that their contents, on their rupture, may be projected to at least twelve inches."

The authority of Carus is cited in support of the ovular theory; but in the last edition of his 'System of Physiology,' this author states that he has found "the Graafian vesicles and *their contained ovules fully developed in the ovaria of children of three and four years of age.*"

Proposition 2.—"It is only at and after the period of puberty that ova are matured in the Graafian vesicles of the ovaries."

We may observe that it has not yet been shown that the decided and important change here indicated really occurs, as is implied, concurrently with the accession of the catamenia. Dr. Ritchie's dissections of the bodies of females in whom menstruation had existed regularly, and who had never been pregnant, show that no great modification of the condition of the ovaries from that preceding menstruation was regularly observed, beyond that a congested state of the ovaries is observed; but this state "does not necessarily give rise to any immediate modification in the manner in which the ovisacs are discharged, or in the subsequent changes which these bodies undergo."

"The progression of the Graafian follicles, or ovisacs, towards the surface of the ovaries, their appearance under the peritoneal coat as copper-coloured macules, the absorption of that membrane and their own tunics, and the occurrence of a solution of continuity at the point at which they unite, take place in the menstrual precisely as in the anti-menstrual life; but in the former the vesicles are increased in bulk, vascularity, and organization, so that in their rupture there is generally a greater lesion of the peritoneum, and after the escape of the ovulum and granular fluid a larger effusion of blood into the cavity, and more remarkable changes in the coats of the ruptured cysts, than in the non-menstrual state."

Proposition 3.—"The maturation of single ova occurs periodically, *i.e.* at the period of menstruation."

We have noticed that Dr. Ritchie's dissections have shown that the presence of menstruation is not necessary for the development or rupture of the ovisacs. It has already been observed, that menstruation may be present without rupture of vesicles; and also, on the other hand,

that vesicles may be ruptured and ova discharged, before menstruation has occurred.

If the period of menstruation were the especial period of the maturation and discharge of ova, the latter should have been detected more frequently in the tubes or uterus, and more constantly after the period of menstruation then at any other time; but this is not the fact,—indeed the reverse obtains: while it may also be noticed that the number of the Graafian vesicles shows no relation to the number of the menstrual periods.

The occasional discovery of recently ruptured vesicles in persons dying during menstruation, as in the cases recorded by Dr. Power, Dr. Robert Lee, Dr. Negrier, and others, must be regarded as coincidences, until the relation of cause and effect can be closely traced. As ovulation is a constant function of the ovaries, and menstruation an occasional function of the uterus, the two may be expected to be found occasionally concurrent.

In the 'Medical Gazette,' Aug. 17, a case is reported from the 'American Journal of the Medical Sciences,' in which, on inspection of the body of a woman executed for murder, the ovaries were found in a state of congestion, with many vesicles approaching the surface. One vesicle was found ruptured, and containing a clot of blood, its inner tunic displaying great vascularity. Menstruation was just commencing. The internal surface of the uterus was coated with blood; its mucous lining congested, especially about the entrance of the tubes. The ovum was searched for, but could not be found in the tubes or uterus. The reporter, Dr. Michel, assumes that it was in the tube, but could not be found owing to the corrugated condition of the lining membrane of the latter. It may, however, justly be demanded that the discovery of this fact alone, in a sufficient number of instances, and with sufficient regularity, shall be received as the solid basis for this ovular theory of menstruation. What shall be regarded as sufficient regularity, may be left to be decided when the fact itself has once been established.

It is not without surprise, seeing the little ground that can be shown for this theory, that we find such an authority as Dr. Meigs thus asserting the assumed fact:—

"When a woman's body, who has perished while menstruating, or soon after the performance of that act, is examined by the anatomist, *he always* finds upon the surface of the ovaries a small bloody spot."

"A woman *never menstruates* without rupturing a Graafian vesicle and discharging an ovulum, and leaving a scar of the opened hila."

These essential facts are a total assumption, no facts in support of which have been offered, if we except the statement of Dr. Lee, that he never examined the body of a woman dying close upon the menstrual period, without finding a ruptured vesicle; whilst, on the other hand, it has been shown that they are not necessarily coincident, that they are only occasionally concurrent. Graafian vesicles are matured and ruptured during both lactation and pregnancy, when menstruation has been absent, a fact which argues strongly against the ovarian theory of menstruation.

As bearing upon the proposition under consideration, we may here

cite a case recorded by Dr. Oldham in 'The Med. Gazette' July 13th. The last menstrual period occurred on Jan. 16th; sexual intercourse took place on the 28th Jan.; it had not taken place for several weeks before, and did not occur afterwards; therefore the woman was impregnated twelve days after menstruating. If the discharge of mature ova happen only at the menstrual period, conception must be limited to a day or two before, or to eight days after, menstruation; or the ovum would be washed away by the flow, and consequently this woman could not have become pregnant, as the date of impregnation is in this instance fixed.

Dr. Oldham here states that he has known cases where impregnation has occurred at the respective times of ten days, twelve days, and twenty-one days after the monthly period; and this is equally the experience of others, as well as that conception often precedes menstruation.

If the maturation occurred as the rule at the menstrual period, pregnancy would not occur so often as it does in the absence of the catamenia, as in the amenorrhœa of lactation and other conditions.

According to the Mosaic law, sexual intercourse is prohibited until after the eighth day after the appearance of the catamenia; to this the strict Jewesses add five days more, in obedience to a rabbinical precept; and yet these women are equally if not more prolific than other females. Then, if the ova be only discharged at the monthly periods, these individuals become pregnant before the discharge of the ova. But the rigid observance of these injunctions by a large number of Jewesses, coupled with the known experience of accoucheurs generally, that impregnation may and does take place immediately before the menstrual periods, affords a much stronger proof that the maturation of ova occurs at any time, than the occasional and infrequent observation of recently ruptured ovisacs concurrently with menstruation affords ovular cause of the menstrual flow.

The words of a writer in the 'British and Foreign Medico-Chirurgical Review' (vol. iii., p. 141), are peculiarly expressive of the opinion now entertained:—"Passing by several minor considerations, there is this great practical anatomical difficulty to be yet overcome, which hitherto, we feel confident, has not been satisfactorily accomplished—viz., the presence of a true corpus luteum, when *we know*, from the fact of impregnation, that an ovum has been cast off; and the absence of any such body after the ordinary menstrual periods. We do not deny the spontaneous discharge of ova in the rabbit, sow, &c. &c., at the time of heat: or that this periodical oviposition is followed by luteal bodies in their ovaries; but we deny that any such bodies are to be seen in the ovaria of the human female as the simple result of menstruation. We have had ample opportunity of comparing the true corpora lutea, which have followed on conception in the female, with the vacated follicles or the extravasated blood which accompany the ovarian congestion of menstruation, and form false corpora lutea. But the two are in no notable particular alike; indeed they are perfectly dissimilar; and, in our mind, it has yet to be shown that the human female is the subject of a periodical œstrum once a month, and that at this time vesicles are maturated

and an ovum discharged, which may be impregnated during its slow progress through the sexual organs, whenever it may come in contact with the semen."

It is often stated, in support of the assumption of the periodical æstrum in the human female, that women are more disposed to sexual intercourse at the menstrual period. We believe, however, that, independently of the moral control of delicacy, the very reverse obtains.

We may here, in reference to this proposition, appropriately quote the conclusion arrived at by Dr. Carpenter:—"It would appear, however, that although such a discharge takes place most frequently at the menstrual period, yet that the two occurrences are not necessarily coexistent."

The deliberate opinion of one who, like Dr. Carpenter, weighs his conclusions with the utmost care, goes nearer to truth than the bare assumptions of talent, however ingenious.

Proposition 4.—"The maturation and discharge of ova ceases with the cessation of menstruation."

Dr. Ritchie's examinations have established the fact, that the Graafian vesicles are formed in the ovaries "from the earliest periods of childhood to the most extreme old age."

The same author states that in old age their organization reverts to the condition of infancy; they even become of a light and fragile texture, resembling cobweb, the slightest pressure or exposure to the air causing them to give way and shed their contents. These observations correspond with the results of the investigations of others also. The proof to the contrary, therefore, rests with the theory-makers.

Proposition 5.—"The augmentation of activity in the ovaries at the monthly periods is extended to the uterus, and produces the menstrual flow."

For aught that has been demonstrated to the contrary, it may be more legitimately assumed that the increased vascular action of the uterus at the time of menstruation is extended to the ovaries, which are, in common with the uterus, the seat of an increased flow of blood at the same time. The extrusion of ova, it has already been said, may occur without menstruation, and the apertures on the ovaries left by ruptured Graafian vesicles may remain for three months after their discharge, menstruation recurring during the same time.

If the discharge of one or two mature ova in the human female be the efficient cause of the constitutional disturbance and discharge of menstrual fluid, it would, *à fortiori*, be expected that the same thing should occur in the lower animals, in whom many ova are discharged. And although, as Müller observes, it sometimes occurs that the sexual heat of the lower animals, *e. g.* the horse and dog, is attended with a sanguineous discharge, this phenomenon is totally different from the regular menstrual flow in the human female, which has no connection with sexual excitement. The congestion of the ovaries at the time of menstruation stands more naturally, after a review of the preceding facts, rather in the relation of an effect than of a cause. It is a mere conjecture that this congestion causes the extrusion of an ovum, and that this discharge of

the ovum causes the menstrual flow. The relation of causation is only admissible when the antecedent circumstances can be shown to have actually and invariably preceded the effect, to be adequate to its production, and to accord with all the circumstances. Such cannot be asserted in the case before us. It does not agree with the circumstances of this proposition, that in painful menstruation the symptoms are referrible to the uterine region; neither does it square with this theory that in prostitutes, in whom menstruation continues regularly, there shall nevertheless be found extensive disorganization of both ovaries.

It is surely only just that something more than unsupported assertions should be looked for, before the admission of a theory which is to revolutionize our entire views of the diseases and the disorders of the female sexual system. The mere ingenuity with which the several parts of a machine shall be put together, will not necessarily ensure correctness in its working, unless these be adjusted with due reference to the motor principle. And here it appears that a complicated mechanism is constructed to work under the control of a primum mobile, the existence of which is but yet a gratuitous assumption.

It is not hereby asserted that such relationship as is claimed for the congestion of the ovaries at the menstrual period cannot be, or that it positively is not; but it is simply required that proof thereof, hitherto wanting, be adduced.

Proposition 6. —"The menstrual flow is a secretion analogous to the decidua."

A profound physiologist, whose researches constitute the greater portion of modern physiological science, states, "We are quite ignorant of the cause of menstruation." . . . . "The menstrual discharge differs from ordinary blood in no other respect than that of containing only a very small quantity of fibrin, or none at all. The blood corpuscles exist therein in their natural state."

All the analyses that have been made of catamenial fluid give as their general results, blood with epithelial scales, and mucus: the latter diluting it so as to diminish the proportion of fibrin. So far, therefore, as chemical analysis has been appealed to, it has furnished no reason for regarding it otherwise than as a hemorrhagic fluid, altered by the fluids of the surfaces over which it flows.

To assert that it is a secretion may square with a theory, but it remains still but a gratuitous assertion, not accordant with pathological phenomena, as a slight excess of the flow, or approach towards menorrhagia, is attended during menstruation with the discharge of *coagula*, showing that the blood is in greater proportion than the mucous fluids of the passages.

In the remarks that have been here submitted, the object has been to ascertain how far the ovular theory can be shewn to rest on facts. The reality of the hypothesis yet remains to be established. The admission of crude theories has in too many instances inflicted lasting injury upon medical science. Medical logicians should, therefore, be jealous in the admission of facts; still more should they be watchful over the employment of assertions, as facts, in the construction of theories. So far as

the subject now under notice is concerned, *facts* do not constitute it other than a plausible and ingenious hypothesis, wanting in the true elements of an inductive theory —in short, an example of the *post ergo propter* line of argument.

The examination, then, of the so-called theory failing to exhibit the grounds of other than an ingenious hypothesis, the actual state of our knowledge of the nature of menstruation may be expressed in the following propositions; whence it will appear that the "ovular theory" has not added much to our previous information:—

1. Menstruation is a *periodical* function of the uterus.
2. Ovulation is the *constant* function of the ovaries.
3. Ova are matured in the ovaries at all ages, but more rapidly during menstrual life.
4. Ova are discharged at all periods of female life, in the intervals of, as at the time of menstruation.
5. Ovulation and menstruation being often concurrent, indicate that they are both the result of the attainment of a certain point in the development of the female economy.
6. The law of periodicity in the one not obtaining in the other, leaves still wanting the inseparable link in the chain of causation whereby menstruation can be shown to be the effect of ovulation.
7. At the menstrual period the ovaries experience an extension of the uterine congestion, and become equally with the uterus the seat of increased functional activity.
8. The menstrual flow is a true hemorrhage, as shown by chemical analysis and by the phenomena of disease. —*Med. Gazette, Nov.* 30, 1849, *p.* 930.

157.—*On the Use of the Exploring Needle in the Diagnosis of Pelvic Tumours.* By Prof. SIMPSON, Edinburgh.—[The following remarks were made by Dr. Simpson, at a meeting of the Edinburgh Obstetric Society:]

Those authors who, some years ago, wrote at great length upon acupuncture, as Beclard, Cloquet, Carraro, &c., all spoke of the impunity with which they found that acupuncture needles could be introduced into the muscles, vessels, and even the viscera of the living body. It was well known that small punctured wounds did not bleed, and the parts punctured generally closed immediately, and left little or no trace of the separation of their tissues by the puncturing instrument, provided it were small.

Taking advantage of the knowledge of these facts, it has been found that using a small grooved needle, or very slender trocar, we can introduce it into various morbid parts, so as to ascertain the nature of their contents. Surgeons had used such exploring needles, for this purpose, in cases of doubtful tumours, in order to ascertain whether they were abscesses, or cysts, or aneurisms, &c. They have been used to explore even large aneurisms without any dangerous result. Dr. Simpson alluded to a case in which a celebrated surgeon was showing to his

pupils the use of the exploring needle, in detecting matter in what was supposed to be an inflamed bubo, before laying it open. Air, however, rushed out, instead of pus, showing the swelling to be formed by the skin inflamed over a hernial sac.

Dr. Simpson mentioned that he had repeatedly used the exploring needle to detect the nature and contents of various kinds of pelvic tumour, when no other means of diagnosis were sufficient for that purpose. He especially adverted to its advantages as a means of diagnosis in some doubtful cases of pelvis abscess, and ovarian tumours, and in cases in which tumours existed about the cervix uteri, the cystic or other nature of which it was otherwise impossible to determine. Would it serve to diagnosticate cases of extra-uterine pregnancy, either by the instrument striking against bone, or by any contents that might pass through the tube?

The instrument which Dr. Simpson employed was simply a very slender silver trocar and canula, the former tipped with a very short steel point, of the form of that of a graving instrument. The tube of the trocar is open for nearly an inch at one side at its point, so as to admit more easily of the escape through the canal of the tube, of any fluid in which its point may be placed. Sometimes Dr. Simpson had applied an exhausting syringe to the outer end of the instrument, in order to produce the flow, along its tube, of any more viscid fluid. Thin fluids, like those of most ovarian cysts, flow readily along the tube, and can be recognised by their microscopic and other characters. When introduced into a sac containing pus, generally a few drops only of the fluid enter the tube of the instrument, from which, however, it can be readily forced, after withdrawing the instrument, by blowing through the tube. If our microscopic characters of specific tumours and morbid structures were more exact than they are at present, the pathologist might ascertain the nature of most morbid tumours that might appear in the living body, by the use of such an instrument, for he could remove by it a sufficient amount of its structure or contents for histological purposes.—*Monthly Journal, Feb.*, 1850, *p.* 196.

158.—*Case in which Twins were Born of Different Colours.* By Dr. CARTER, Virginia.—The negro woman Winny is 23 years old, of good constitution, and as black as the ace of spades. She has borne three children previously to this labour. She says, that in April, 1848, she had connexion with a white man, and on the following day with a black one. About a week or ten days elapsed, when the catamenia failed to appear. In February, 1849, about the middle of the month, she was delivered of twins, the dark coloured child being first delivered, and afterwards the mulatto. The children are robust; one of them is a mulatto, and the other as dark as negro children generally are. The woman is certain they were begotten by different fathers, and this is the conclusion to which all have come who have seen the children. ('Philadelphia Medical Examiner.')—*Brit. and For. Review, April*, 1850, *p.* 548.

159.—ON THE USE OF CHLOROFORM IN MIDWIFERY, AND AS A SEDATIVE OF UTERINE PAIN GENERALLY.

By Dr. J. Henry Bennet, Physician-Accoucheur to the Western General Dispensary; and others.

[Chloroform has now had time to be tested amply in obstetric practice. The opinions of eminent men, however, still clash respecting it. Dr. Bennet states that he has used it very extensively, both in labour, and in dysmenorrhœa, and uterine pain generally. He thinks that the amount of danger incurred by its administration is so small, as not to forbid its use when it is likely to be therapeutically useful, or when the patient shrinks from pain. Dr. B. observes:]

The very greatest care, however, ought clearly to be shown, and I cannot too decidedly urge the precaution on which I laid so much stress two years ago,—viz., that of seeing that the chloroform vapour is mixed with a sufficient quantity of atmospheric air for the purposes of respiration; so that, on the one hand, asphyxia may not be produced; and that, on the other, the sedative effect of the chloroform on the nervous centres may take place gradually, so that the latter may not be instantaneously paralysed by the *sudden* presence of a large quantity of chloroform in the system. It is for this reason that, like Dr. Simpson, I generally prefer, for inhaling, a thin cambric handkerchief, to the various inhalers now in use. The former appears to me to admit more easily of gradual, progressive chloroformization. Extreme caution in the first stage of inhalation is the more necessary, as, in most of the cases of death from chloroform that have been recorded, it seems to have taken place after a few inhalations only, and from a quantity of chloroform, which appears incredibly small (half a drachm, or a drachm) to those who are in the habit of using it, who continually find it necessary to give four or five times that amount, in order to produce complete anæsthesia.

Within the last eighteen months, I have myself taken chloroform to the full surgical extent, on three occasions, with perfect success; twice for dental operations, and once for the extirpation, by Mr. Fergusson, of a fatty tumour from the shoulder. On each of these occasions, but especially on the two first, when a less perfect inhaler was used, I distinctly and painfully felt the sense of suffocation occasioned by the absence of a due supply of atmospheric air. This error is the more dangerous, as all sense of the wants of the economy is lost as soon as anæsthesia commences, and the patient may then be asphyxiated by the absence of oxygen, without any sense of suffocation being experienced or manifested.

I still administer chloroform in four classes of cases. 1. In irregular but natural labour. 2. In operative labour. 3. To facilitate operations on the uterus. 4. To subdue uterine pain in dysmenorrhœa, &c.

I. In *natural labour*, I seldom resort to the inhalation of chloroform, unless it be occasionally to facilitate its last stage, or to allay some morbid conditions of the nervous and circulatory systems, which may be interfering with the progress of parturition. The pains of labour are sometimes partially arrested, diminished, or rendered irregular and inefficient, by fear, impatience, want of self-control, or by long-continued

suffering. When this is the case, chloroform generally exercises an all-but-magical effect. Under its influence all nervous excitement is soothed, the pains gradually become more regular, powerful, and efficient, and the labour once more progresses normally. This return of the labour pains, and their regularization under the calming influence exercised by chloroform on the brain, probably explains the increase in their intensity, noticed by some writers, on its first administration; and thus is explained the apparent discrepancy of different observers, on which so much stress is laid by the opponents to chloroform. If the pains are arrested or modified by nervous reaction, they return: if, on the contrary, they are too violent and prolonged, as is sometimes the case in the latter stages of parturition, when the soft parts are rigid and irritable, the intensity of the pains diminishes on the withdrawal of the excess of stimulation.

The disordered state of the circulation, and the congested condition of the capillaries, which are often observed in the cases to which I have alluded, also give way, in a most remarkable manner, to the calm produced by the inhalation of chloroform. This is so much the case, that since I have had recourse to it, I have never found it necessary to bleed from the arm during labour; the inhalation of chloroform having always been indirectly efficacious; even in some cases in which the cephalic congestion was so great as to make me fear convulsions.

Although I never hesitate, as will be perceived by the above remarks, to give chloroform in natural labour, whenever I think it may be of use, I do not urge my patients to take it, merely as a remedy for pain. If they wish to avoid the pangs of parturition, and are anxious to inhale chloroform (as I most certainly should, in their condition), I do not object to its administration. Firmly believing its careful inhalation to be innocuous to parturient women, I do not see how I can object; but I never press them to resort to it, not feeling called upon to interfere with a natural function, even to allay pain, if my patient be willing and able to bear it.

II. In *operative midwifery*, I continue to derive valuable assistance from chloroform. The cases in which I have resorted to its use, have been, exclusively, turning and retained placenta. In consultation and dispensary practice, the accoucheur occasionally meets with instances, in which the placenta has been retained for some hours, before he sees the patient. In these, and in the more difficult forms of turning, chloroform very much simplifies the operation, by rendering the patient unconscious of pain, and perhaps by slightly relaxing the rigidly-contracted uterus. In craniotomy, the pain inflicted on the mother is generally so slight and the duration of the operation is often so pro longed, that the inhalation of chloroform is scarcely, if at all, indicated. As I am also one of those accoucheurs who very seldom find the application of the forceps necessary, or even warranted, I have scarcely had an opportunity of judging as to the advisability of placing the patient under the influence of chloroform, prior to their use. I should, however, feel inclined to give a negative opinion, as either the maternal parts are sufficiently roomy to admit of their application without pain, or they are not; and, in the latter case, the danger of injury to the mother would only be increased by her unconsciousness.

I have only once had to contend with post-partum hemorrhage, after the administration of chloroform, during or after labour; and in the case in question, the patient, the wife of a medical practitioner, was labouring under disease of the heart, unknown either to her husband or to myself.

When administering chloroform in simple midwifery, I never give it to such an extent as to annihilate pain, but merely so as to allay or deaden it; in a word, I do not attempt to render the patient totally unconscious of her sufferings, but merely to render them bearable. In operative midwifery the anæsthesia must necessarily be pushed further, that is, to the surgical extent, as the intention is then both to render the patient unconscious of what is done, and to obtain the muscular relaxation, to which this stage of anæsthesia gives rise.

III. In *uterine examinations and operations*, chloroform is occasionally very useful to me; though, as a rule, no instrumental examination of the uterus need be painful, if an instrument proportioned to the degree of dilatability of the vaginal orifice be used, and proper gentleness be observed. There are cases, however, in which the fears of the patient are so great, that the use of chloroform may be desirable; there are also cases in which the uterus, its neck, and even the vagina, are the the seat of such intense neuralgic sensibility, that interference of any kind is all but impossible, unless the patient be under the influence of chloroform.

I have now under my care a case of this kind, a married lady, aged 26, who for the last four years has been a martyr to neuralgia of the most intense and agonising description. The neuralgic affection has occupied principally the branches of the fifth pair, the nerves of the uterus, and occasionally those of other parts of the body, and has evidently been connected all along with extensive ulcerative disease of the cervix uteri. The uterine disease appears to have followed an abortion some years ago, and had been totally overlooked until she consulted me. The entire pharmacopœia had been ransacked, and the most powerful sedatives had been administered for years, without any favourable result. A careful digital examination of the uterus having brought on a frightful neuralgic attack which lasted a fortnight, I determined to put her under the influence of chloroform, and thus was able to bring to light a very extensive ulceration of the cervix. This organ was lacerated; and the seat of great inflammatory enlargement. I have now given this lady chloroform to the full surgical extent for fourteen consecutive weeks, that is fourteen times, and she has seldom taken less than half an ounce on a handkerchief, and sometimes more. I was very unwilling thus to continue its administration; but, until within the last week or two, she has never been able to bear the slightest interference whilst conscious, not even an injection of warm water. The disease, however, is now all but cured, and the morbid sensitiveness is fast disappearing. She has had no regular neuralgic attack for the last two months, and will evidently get quite well, both of the local disease and of the neuralgia which it occasioned. I have not been able to discover, in this patient's mental or general state, any detrimental effect whatever from this lengthened administration of chloroform. It occasionally gives

rise to sickness, but that is all: nor does there appear to be any difference in her subsequent condition, whether she have taken much or little; the quantity inhaled in order to produce the same anæsthetic effect varies, without our being able to discover the cause. Sometimes she becomes insensible after a couple of minutes' inhalation; sometimes after eight or ten only. This case appears to me to prove the general innocuity of chloroform, even when taken in large doses and for a continuance. The last time it was administered, it was for the application of leeches to bring on menstruation, or to supply its deficiency, the menses being delayed to her great distress; and although she was kept under its influence for half-an-hour, there was even less subsequent distress from sickness than usual.

IV. In *uterine pain* from dysmenorrhœa, cauterisation, or from any other cause, chloroform continues to prove, in my hands, a valuable medicinal agent, either when given by inhalation, or internally as a medicine. It is, however, capricious in its action, and not to be depended upon in every case, especially when administered internally: its virtues as a sedative of pain are also much more decided when inhaled than when taken. The most propitious moment for inhalation with this view, but the most inconvenient to the medical practitioner, is at bed-time; it will often insure freedom from pain, and a night's rest, when every thing else fails. For this effect to be obtained, however, the patient must remain perfectly quiet on recovering consciousness; and this is the reason that night is so much preferable to day for inhalation. If the patient who has inhaled chloroform be once thoroughly roused, the sedative effect frequently passes away.

When given internally, twenty, thirty, or forty minims of chloroform should be mixed with mucilage, or with the yolk of an egg, previous to water being added, so as to be held in suspension. If a little camphor be added to the chloroform, which soon dissolves it, the solution will also mingle with water.—*London Journal, March* 1850, *p.* 265.

[Dr. MURPHY, of University College, says:]

Chloroform is very volatile and very insoluble, as Dr. Snow has fully explained in his valuable monographs on the subject. Mr. Nunneley's experiments point out its local action. When applied to the skin, or any of the tissues, its immediate effect is, "to induce redness, some tumefaction and paralysis, with loss of feeling of the part which has been exposed to its influence." Bearing in mind these three facts, its action may be understood. The vapour of chloroform, diluted with atmospheric air according to the strength of the dose, when drawn into the lungs, is rapidly diffused over an immense extent of mucous surface, surrounded on all sides by innumerable blood-vessels and nervous fibrillæ. It first acts as a stimulant, exciting cough, hurried breathing, a sense of choking, cerebral excitement, and even convulsions; but this effect is almost instantly followed by the sedative influence of the vapour. When chloroform is perfectly pure, the stage of stimulation is scarcely noticed, being so rapidly succeeded by anæsthesia; but if impure, it is the reverse,—which proves the importance of attending to the quality of the chloroform that is used, if we would wish to measure accurately its effects. In the

lungs it is brought into immediate contact with the ultimate ramifications of the nerves and blood-vessels that surround the vesicles, and passing through these, it is taken into the pulmonary circulation. Mr. Nunneley "is inclined to think the action is primarily in all cases, and principally, if not entirely, upon the nerves;" and if so, the sedative effect is instantly communicated to the cerebro-spinal axis, and from thence reflected over the whole of the sentient nerves. Such, however, is not the effect when locally applied elsewhere—the loss of sensation seems quite confined to the part, or to progress but slowly over the body; the extent of nervous surface exposed in the lungs, as compared with other parts, may, however, account for this difference. Dr. Snow has shown, by experiments very carefully conducted, that the vapour of chloroform is absorbed into the blood, and that the quantity absorbed bears a fixed proportion to that which is inhaled. He gives a formula, also, by which the quantity of this and other vapours contained in blood may be ascertained; and he proves that those fluids which are least soluble in the blood, and the most volatile, act with the greatest power. Chloroform possesses both these properties. It is very volatile, and is therefore rapidly diffused. It is only slightly soluble in the serum of blood, and consequently the blood dissolves much less than it absorbs. This will explain the rapidity of its action; because a certain portion, being free, is immediately conveyed from the lungs to the heart, and from thence throughout the whole circulation. It will also account for the slight change that takes place in the blood, in proportion to the effect produced. In surgical operations the colour of the blood is unaltered. In animals that have been promptly killed by it, the lungs retain their scarlet colour; nor is it until the respiration is impeded by the vapour, while the heart is acting and distending the lung, or that the animal is exposed a very long time to its influence, that we perceive any real change in the colour or consistency of the blood. The rapidity with which its effects disappear may also be understood on the same principle. The moment that chloroform ceases to be inhaled, it quickly escapes from the circulation and is exhaled, leaving only a small portion behind to separate more slowly. In this respect chloroform differs essentially from alcohol, and may be contrasted with it. Alcohol being very soluble in blood, mixes with it freely, and circulates at the rate of the blood itself, hence it is comparatively slow in its operation; when inhaled, it produces little or no effect. We all know its effect when taken into the stomach—its powerful action as a stimulant, but having no anæsthetic effect, unless taken in large quantities. The two hydro-carbons may be placed side by side.

CHLOROFORM.	ALCOHOL.
Slightly soluble in serum.	Soluble to any extent.
Very slightly stimulating.	Highly stimulating.
A most powerful sedative even in small doses.	No sedative effect, unless when taken in large quantities.
Its effects rapidly disappear.	Its effects continue for hours.
Most powerful when inhaled.	Least powerful when inhaled.
Comparatively slight effect when administered by the stomach.	Effect most powerful when taken into the stomach.
No alteration in the appearance of the brain in cases where it has caused death rapidly.	Apoplectic congestion of the brain, where it has been fatal.

Such are the differences in the effects of these fluids, and yet we are told that the insensibility of chloroform is only another term for intoxication. The amount of solubility in the blood seems to be a most important item in estimating the effect of anæsthetic agents. Their stimulant action appears to be in direct proportion to their solubility, their sedative power to be in inverse proportion. If we assume that a free undissolved portion of chloroform passes rapidly from the lungs to the heart, and thence throughout all the vessels of the body, its effects on the constitution may be understood. First on its arrival at the heart, a safe dose will only act as a stimulant, or perhaps not at all. In some cases where the patient is previously excited by apprehension, and the heart, in consequence, pulsates rapidly, chloroform may reduce these pulsations by controlling the mental excitement; but this is very different from the slower and *feebler* beat that is the result of its sedative effect. This symptom is most important to attend to, because sudden death is the consequence if the heart's action be suspended—the syncope of chloroform is fatal; and if too concentrated a dose be inhaled, the excess of free chloroform may be so great as at once to paralyse it. The brain gives evidence of its effect in loss of consciousness, the medulla oblongata in slow deep stertorous respiration, the spinal marrow in more or less perfect loss of sensation and motion, and in the dying activity of reflex action. The different degrees of its influence on the vital functions have been fully pointed out by Dr. Snow; but that effect which has the most important relation to our present subject is the independence of sensation and consciousness. Mr. Nunneley observes, as the result of several experiments, that "the animal, after recovering from sopor, is often conscious long before there is any muscular power or even much sensation; indeed, after a moderate dose, or when the dose is not sufficient to induce a complete state of anæsthesia, consciousness remains where there is no power of motion and but little sensation, as everybody who has inhaled any of these substances knows." This effect has been frequently noticed by the writer, and seems to him to be one of its most valuable actions in obstetric practice. A moderate dose will diminish if not remove sensation, without destroying consciousness. The patient is afforded relief from the extreme intensity of her sufferings, without being put to sleep, and also by a dose of chloroform that may be given without the slightest risk. The reverse of this sometimes happens under more full doses—consciousness is lost, but sensation remains—a metaphysical difficulty certainly, but which, nevertheless, seems to be true. In one of the cases related, the patient complained of her back, placed her hand upon it, seemed to feel the full force of her pains, but, after her delivery, knew nothing about it—she said "she *felt* no pain." When death takes place, the influence of chloroform on the vital functions may be either progressive or simultaneous. Loss of sensation, motion, and consciousness, may be followed by stertorous, laboured, feeble respiration, and this by the gradual cessation of the heart's action; or they may occur all at the same moment, the pulse, respiration, and consciousness, ceasing together. Hence the post-mortem appearances in man and the lower animals vary, and are influenced very much by the rapidity of the effect. After the most powerful doses the lungs are collapsed, the heart flaccid

and empty, or the right side *moderately* distended by the cavæ, and the left ventricle contracted by the rigor-mortis; the brain is natural. But when death is less instantaneous the lungs are congested, ecchymosed, emphysematous; the right side of the heart and cavæ distended, sometimes enormously; the sinuses and membranes of the brain filled with blood.

[Dr. Murphy recommends that in ordinary cases of labour the dose of chloroform should be only very small; and herein consists, he observes, the safety of the practice. He says:]

In natural labour, the full anæsthetic influence of chloroform may certainly be safely induced, but it does not appear to the writer necessary to go at all so far. It seems to him sufficient to diminish the intensity of the pains. This may be accomplished without putting the patient to sleep, without even disturbing, in the least degree her self-possession; perfect consciousness may remain, and yet the agony of suffering be completely subdued; when chloroform is given for this purpose, the quantity is so small, that no interruption to the action of the uterus could be produced; whenever this has happened, the dose has been sufficient to soporise the patient, but even here such an effect was only temporary, and passed away with the chloroform, when the uterine contractions returned with more power and efficiency than before it was inhaled. In order to subdue the pains of natural labour, the writer generally pours about a drachm of chloroform on the sponge of a small inhaler. This is applied to the mouth alone, by which means atmospheric air is freely mixed with the chloroform, a certain portion passing into the mouth with the vapour, while the customary tract for respiration remains perfectly free. The quantity of chloroform really admitted into the lungs, diffused as it is in so large a quantity of air, must be very small—so small as not to excite the least sense of suffocation in its passage. If this quantity produce no effect, the dose is increased until it become sufficiently pungent to render the inhalation rather difficult. Its strength should always be tested before being given to the patient: a single inspiration will be sufficient to prove this. If the very moderate quantity first used should act with a power disproportioned to the dose; if it excite the patient, produce incoherency, or interfere with the action of the uterus, chloroform should be at once withdrawn. The time usually selected for its administration is in the second stage of labour, when the pains are increasing to their highest degree of intensity.

In operative midwifery, a more powerful dose is requisite. In such cases the writer prefers the inhaler of Dr. Snow, by which the quantity of chloroform given can be accurately measured. When used by Dr. Simpson, or those who are perfectly conversant with the effects of chloroform, the handkerchief is certainly safe: besides, it is convenient and most efficient; but in the hands of the profession at large, it appears to the writer to be the most hazardous method of administration that can be employed. As a proof of this, it is sufficient to say, that in all the fatal cases reported, with two exceptions, chloroform was given on a handkerchief or cloth. Dr. Snow's inhaler being applied to the mouth and nose, inhalation is continued until sensation and consciousness are lost.

If the patient become restless or incoherent, the dose must be increased, and a few inspirations will be sufficient to produce sopor. The moment that the desired effect is obtained, inhalation should be discontinued, and not again renewed until there is some evidence that the influence of chloroform is disappearing. It should then be repeated only at intervals, according as it is necessary to maintain the effect. The quantity of chloroform consumed in these cases is greater than in natural labours, but the time of inhalation is much shorter, and in this respect more resembles surgical operations, with this difference, that in obstetric operations the degree of anæsthesia need not be so great. The perfect stillness essential to the success of an operation where the scalpel is cutting its way through the very springs of life, is not required for midwifery practice.

The importance of using pure chloroform is alluded to by every writer who has paid any attention to the subject. Pure chloroform should contain no oxygen, and the more it approaches to chloric ether, and to the properties of alcohol, the more exciting it becomes. Hence it is probable, that in those cases where most excitement was manifested, the effect might be attributed to the impurity of the chloroform employed. On the other hand, it should be remembered, that perfectly pure chloroform is most prompt in producing its sedative effect, and therefore it should not be recklessly administered. When the quantity of chloroform inhaled is sufficient for the purpose, it may be known by observing the pulse, the respiration, the voluntary muscles, and the eye. The pulse—that may have been increased—becomes slower and *fuller*. The respiration, also, is slower and deeper, as in sleep. The voluntary muscles have lost their power,—the arm drops. The eyes are inclined upwards; the pupil is sometimes dilated, but always contracts sluggishly. If the quantity is more than enough, the pulse may not only be slower, but *feebler;* a symptom which should never be passed over. The respiration becomes stertorous. In surgical operations this degree of narcotism is generally required, but it is not so in obstetric practice. Spasmodic contractions of the voluntary muscles may occur. As soon as the respiration becomes slow, deep, and regular, chloroform may be withdrawn, because its action will continue to increase for some time afterwards. If it should not do so, it can be renewed. By allowing sufficient time for chloroform to develope itself, and by ordinary attention to its effects, the practitioner can scarcely err in its administration.

The writer having given the subject of anæsthesia his best attention, he feels perfectly assured that chloroform neither impairs the contractile power of the uterus, nor injures in any way either the mother or the child; and that if ordinary caution be used, and if the administrator is conversant with the properties and the effects of the agent he is employing, there is no risk whatever in the administration of chloroform. But at the same time it must be understood that these conditions are absolutely essential. The closest attention should be paid to the manner in which the influence of chloroform is developing itself, and equal care should be given to the quality of the chloroform that is used.—*Monthly Journal, Dec.* 1849, *p.* 1253.

[Dr. WALLER, Professor of Midwifery at St. Thomas's Hospital, holds very different opinions from the preceding ones. His deductions on this subject are drawn less from his own experience, he tells us, than from the published experience of others. After remarking that the state of a parturient woman is very different from that of a person about to undergo a surgical operation, the former being usually one of health, the latter almost necessarily one of disease,—and that, therefore, the question of the use of anæsthetics in midwifery practice is quite distinct from that of their employment in surgical operations,—Dr. Waller proceeds to say:]

In experiments upon animals I have noticed the three following results: first, agitation, amounting, in some cases, to convulsions; secondly, anæsthesia; thirdly, death, and this not preceded by any symptom indicating the approach of a fatal termination nor as a consequence of a long continued use of the chloroform. Can it with truth be asserted, that these results have only been witnessed in the inferior animals, and never observed in the human subject? Would that experience (the best of teachers) would warrant such a statement. The records of cases, published in our public journals, testify to the contrary, death has occurred after a very short inhalation, in some cases suddenly, in others preceded by convulsions. In my own practice, I have seen delirium produced of so violent a character as to render the patient for some time uncontrollable. In another case, a very "horrible feeling of oppression" about the præcordium was produced, attended with a feeling as though the "heart would burst"; then followed unconsciousness. On her reviving from this state, the lower extremities were paralysed to a considerable extent, and for the two following days this lady was unable to move about. This happened about two years ago, and from that period my patient informs me she has never been in perfect health. In two other instances the attempt at inhalation produced such a feeling of suffocation that it could not be persevered in. Two cases of death, one during, the other immediately following labour, have been reported to me; another wherein serious hemorrhage occurred. Dr. Montgomery states that in his own practice he has known the proper muscular action of the uterus for a time suspended.

I am fully aware that a ready, though somewhat flippant reply may be offered; it may be said these cases were exceptions to the general rule, or the remedy was improperly administered, or that a too powerful dose was employed. All this, to a certain extent, may be true, but still the practical difficulty remains. I know that, where every reasonable precaution has been taken, hurtful and fatal consequences have followed, and this is sufficient to prevent *me* from employing these agents indiscriminately, and without a conscientious belief that of two evils I was choosing the least. Having proceeded thus far, it will scarcely be necessary to add, that in cases of strictly natural labour, where nothing is to be gained but unconsciousness of pain, and that at the risks before alluded to. I should never consider myself justified in making use of means which can only accomplish the object intended by reducing the patient to a state of mere organic existence by paralysing those portions of the brain from whence the nerves of sensation and voluntary motion derive

their influence; and especially since the fact is well established, that occasionally the nerves of respiration and circulation are alike paralysed, when death must inevitably ensue.

It is extremely difficult to determine with precision what is the effect of this narcotism upon the action of the uterus. If we could credit the accounts which have been published from time to time, the following conclusion must necessarily follow: that the system generally, and the parturient organs locally, are made so remarkably tractable, that they accommodate themselves to the exigencies of the peculiar case, and to the wishes of the practitioner. Thus we are told, that under the use of chloroform the most opposite effects have been produced; in the one instance it will contract, in another it will relax! in a third, where everything is going on favourably, no special action ensues. The inhalation is, therefore, proper, whether we wish to expedite labour, to prevent hemorrhage, or to render the uterus quiet for the purpose of introducing the hand in cases of difficult turning. Again, it has been said that perfect insensibility on the part of the patient is a great boon to the practitioner in cases of instrumental midwifery, inasmuch as the operation is unattended with pain, and no sudden movement of the female will obstruct the progress of the delivery. During an extensive midwifery practice of nearly thirty years, I do not recollect ever to have been resisted by these movements except once, whilst on the other hand I cannot but consider that perfect susceptibility to pain may sometimes prevent the infliction of serious injury upon the maternal soft parts. The teachers of midwifery should remember, however simple and easy obstetric operations have become to them in consequence of their frequent performance, that their recommendations and opinions will influence the practice of those who have not, and never can have the same opportunities; and that what may be perfectly safe in the hands of the few, may not be equally so in the hands of the many.

As regards myself, I have a very decided objection to the use of chloroform in instrumental midwifery, especially where craniotomy is performed in the more aggravated cases of pelvic deformity, where it often happens that a rough edge of the fœtal bone comes into contact with the soft parts of the mother, and to which the attention of the practitioner is probably first directed by a complaint that "something is scratching." I must not, however, forget that the production of anæsthesia is destined to explode that barbarous operation, and that henceforth patients, whose cases require craniotomy, are to be placed under the influence of chloroform, the infant turned, and violently dragged through the contracted pelvis; as if, with the loss of sensation, there would be no danger of injuring the soft parts by the exercise of any degree of force necessary for the accomplishment of the desired object!!

From the foregoing observations the following conclusions may be fairly deduced:—

1st. That the inhalation of ether and chloroform has been followed by injurious and fatal results.

2nd. That in natural labours no reason exists for the employment of a remedy, the efficacy of which is at least doubtful, and its action often hurtful.

3rd. That the action of the uterus is sometimes suspended; but the published accounts are so contradictory, that it is impossible to form an accurate judgment on this point.

4th. That the production of anæsthesia in operative midwifery is likely to be injurious rather than beneficial.

I will merely add, in conclusion, that the only cases which appear to justify inhalation are the following:—

1st. Where there is an unusual degree of nervous excitability and sensitiveness. I should, however, not be inclined to produce perfect insensibility, but should be satisfied with *diminishing* the powers of sensation.

2nd. Where there are severe muscular pains in the neighbourhood of the uterus, interfering with its action. This state has been well described by Dr. Power under the generic term "myopathia," of which he describes several varieties. In these cases I should recommend moderate inhalation, and not the production of perfect narcotism.

3rd. In very difficult cases of turning, some benefit might *possibly* be obtained, although in many instances, a dangerous amount of force might (unless great care be taken) be employed in extracting the child when the patient is in a state of insensibility. —*Med. Times, Nov.* 10, 1849, *p.* 375.

[Dr. Tyler Smith has experimented in various ways to test the peculiar action of chloroform, if any, on the uterus, and gives us his opinions deduced from these experiments, as follows:]

The increased uterine action observed under the administration of chloroform in natural parturition, would appear to be analogous to the increase of the spinal function on the first inhalation of this agent. A thousand facts in obstetrics testify most irrefragably to the influence of the spinal marrow, and of the reflex function, in parturition. That, under the influence of chloroform, stimulation of the spinal marrow is observed in the first instance, appears to be proved experimentally. In human labour, the motor influence of chloroform may be also increased by mental emotion, at the instants of passing into, and escaping from, anæsthesia. In some cases, when the anæsthetic is used in great moderation, its effects, however long continued, may, perhaps, be simply stimulant.

Where the motor pains of labour are rendered less vigorous by chloroform, we may infer that it is because the function of the spinal marrow, particularly of its lower portions, is enfeebled by chloroform, as in the experiments in which the reflex actions were so much reduced in power. The uterus and the parturient functions are left chiefly to the peristaltic action of the organ.

But we know, that under these circumstances, delivery nevertheless takes place. The pains may appear weaker, but the child is expelled in many cases without any unusual delay, and, in others, after labours of very tardy progress. In many cases where the labour is completed within the common period, labour is said not to be interfered with by chloroform, though in reality it may be, to a very considerable extent.

It has been mentioned, that in deep chloroformization, the sphincteric

orifices of the pelvic viscera are relaxed. In the use of chloroform in labour, it is universally maintained, that unusual relaxation of the vagina and perineum is produced. This is naturally explained by the diminished energy of the spinal function. The vagina, the muscles of the perineum, and of the floor of the pelvis, lose some of that reflex power which affects all muscles, and by virtue of which they resist the passage of the fœtus, until full dilatation has been performed by the gradual advance of ordinary labour. Thus, though in the use of chloroform in labour, a power of expulsion is taken away, a power of resistance is at the same time withdrawn. In the balance of the two, labour proceeds, and, in some cases, even more rapidly than usual; in others, again, the process is very tardy or impossible. As already observed, chloroform does not commonly dilate the sphincters when given in labour, or in operations, to such an extent as to cause the escape of the contents of the bowels and bladder; but it does so when given in excess. In the relaxation of the parturient passages in labour, the dilatation, though partial, is still sufficient to render labour performable, by a less exercise of motor force than usual. The existence of dilatation is at once an indication of the presence, and a measure of the extent of the failure of the spinal motor powers in parturition.

It has been seen experimentally, that the peristaltic action of the uterus continues vigorous after the total annihilation of the direct and reflex action of the spinal system. It is this power which effects delivery, in some cases, in the human subject in paraplegia, and even after death, when at least the actions of respiration, and of the heart, have entirely ceased. In cases of labour proceeding under the influence of chloroform, when the anæsthetic is pushed to the extent of enfeebling the spinal function, it is, as I believe, the peristaltic action of the uterus which, in the great majority of cases, is then the principal agent in delivery.

Thus, in anæsthetic midwifery, the natural arrangement of the motor powers appears to be modified in the following manner. The reflex function, as concerned in parturition, is affected in two modes. 1. The reflex actions are weakened, so that the impression of the advancing fœtus upon the excitor nerves of the parturient canal, does not excite their wonted reflex actions to the same extent as usual. The spinal *contractions* are below the average. 2. On the other hand, all the parts concerned in the dilatation of the parturient passage and outlet, are in a state of relaxation, depending upon the condition of the spinal function. The spinal *dilatations* are increased by the influence of chloroform. While this state of things obtains, the peristaltic action depending upon the ganglionic system remains in the ordinary state of activity, and in the relaxed state of the passages, is sufficient in many cases to effect the delivery of the fœtus, without any unusual delay. This dilatation of the parturient canal also exists in certain cases of paraplegia, and even after death; so that the occurrence of delivery during profound anæsthesia—the occurrence of delivery, in some cases, in experiments in which the lower portion of the spinal marrow is injured or destroyed—the occurrence of delivery in the dead subject,—are no proofs whatever that the spinal marrow is not actively concerned in natural parturition, or that

peristaltic action is the sole power by which the fœtus is expelled in natural labour in the human female, where the dilatation of the parturient canal is commonly a painful process. Delivery under chloroform, appears, then, to be a pathological condition, in which, as regards the motor actions, a state of artificial dilatation compensates, in some degree, for the deficiency of expulsive power. From these data, as it appears to me, we must survey the motor derangements which are declared sometimes to occur in the practice of chloroform.

The facts relating to the destruction of the spinal functions, including the respiratory function, tend to show, that in the treatment of persons dangerously affected by chloroform, the attempt to excite artificial respiration alone is not likely to be attended with success; but that the peristaltic action of the heart should be kept up by galvanism, and other direct stimuli, until, if possible, the poison shall have been eliminated from the spinal system. It appears evident, that after the reflex movements of respiration have ceased, the heart may still act; and to this organ attention should, I think, be chiefly directed in the attempts at resuscitation in accidental poisoning by chloroform.

The experiments detailed, furnish some important obstetric hints of a practical nature. It has been recommended by the advocates of anæsthesia, that the ergot of rye should be given with chloroform, in certain cases, in order to strengthen the actions of the uterus in tardy labours. A little consideration will show, however, that the ergot is not likely to be serviceable in uterine inertia, complicated with chloroformization. There can be no doubt that the ergot itself acts as a spinal excitant, sometimes even producing general tetanic movements in the limbs of the parturient woman. It is little better than a contradiction, to give a spinal *stimulant* and a spinal *sedative*, at one and the same time. The true indication in this form of inertia would be, to stimulate the peristaltic action of the uterus by galvanism, or by direct mechanical irritation. The appeal should be made, not to the spinal function—at least not while the influence of the anæsthetic continues—but to the peristaltic action of the uterus, which remains unimpaired by the chloroform, after the spinal function has been enfeebled.

In uterine hemorrhage after delivery, occurring under the use of chloroform, the knowledge of the peculiar way in which this agent affects the nervous system, supplies important indications of treatment. Reliance should not be placed upon the administration of ergot, or the excitation of uterine reflex action by cold or other means; but on mechanical pressure, the galvanic stimulus applied to the uterus, and direct mechanical stimulation of the organ. In the arrest of uterine hemorrhage under chloroform, there can be little doubt, that we have the serious disadvantage of the loss of one of the most efficient motor powers for its arrest. Similar considerations also apply to those labours and obstetric operations, in which a diminution of the motor force of the uterus is of temporary advantage, and in which a safe and manageable sedative of the utero-spinal action would be an invaluable boon; but to enter fully upon these matters on the present occasion, would occupy more space and time than I can either claim or afford.

The principal conclusion deducible from the experiments detailed in the present paper, and warranted by the experience of chloroform in midwifery, upon which I would insist, is this,—that chloroform enfeebles the action of the spinal marrow and the reflex function, *pro tanto*, according to the profoundness of the anæsthesia induced, but that it leaves the peristaltic actions little, if at all, affected, so long as life continues. Besides the influence of volition and emotion, the action of the uterus in PARTURITION is both REFLEX and PERISTALTIC; the peristaltic action being, as I have insisted, in my work on 'Parturition and Obstetrics,' "the basis of the other uterine actions",—"the basis or radical element upon which the other causes of motor action operate"; and I quote these words to show that I have not underrated the importance of uterine peristaltic action. Setting aside natural labour, abnormal parturition may be divided into two great classes,—1. Parturition with diminished motor action. 2. Parturition with excessive motor action. The study of the relation of chloroform to these two classes of difficult labour, and to the different forms of motor power concerned in natural and difficult parturition, is scarcely less important than its study as an anæsthetic. I have attempted to supply the indications according to which this study should be pursued.—*London Journal, Dec.* 1849, *p.* 1111.

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ADDENDA.

160. ON THE USE OF TANNIC ACID IN VARIOUS DISEASES.
By Dr. S. Scott Alison, London.

[Dr. Alison has found tannic acid extremely useful in many diseases. He makes the following observations respecting its employment; and first, as an *astringent*, for which purpose Dr. A. thinks it equal to any agent, whether vegetable or mineral, that he has ever employed.]

Internal use. In the *chronic bronchial catarrh* of weakly and elderly persons, unconnected with disease of the heart or great blood-vessels, and attended with copious and debilitating expectoration, the administration of tannic acid by the mouth, in doses of one, two, and three grains, two or three times daily, has greatly and gradually abated the secretion, relieved the frequent cough, and improved the strength of the patient. In the second stage of *pulmonary consumption*, viz., that of softening, when bronchial catarrh has been present to a large extent, weakening the patient, causing frequent cough, and disturbing sleep, the same results have followed, and have greatly contributed to the comfort and welfare of the sufferer. But in pulmonary disease, the greatest amount of benefit has obviously been derived when large cavities have been present in the lungs, the walls of which have thrown out large quantities of purulent matter, occasionally mixed with blood. In such cases, the discharge has been effectually controlled, and the rate of tear and wear of the system obviously restrained, without the induction of oppression or other evils.

In *chronic diarrhœa*, which had resisted the ordinary treatment of chalk, opium, and regulated diet, and was not dependent on obstructive disease of the heart or liver, tannic acid, in a solid form, has proved of surprising efficacy. In cases of severe disease, depending on an irritable weakly mucous membrane, I have not known of one failure; and of those examples connected with chronic inflammation and disorganization of the mucous membrane, only two proved beyond the influence of this remedy. These two cases occurred during the last autumn, while cholera was prevalent; and the disease of the mucous membrane was extensive. The complaint in one of the examples was of long standing, and the patient had been addicted to habits of intemperance. But it was not tannic acid only that failed; the salts of copper, iron, lead, and zinc, in large doses, proved to be of no more avail. In this form of disease, tannic acid was administered in the form of pill, in combination with opium.

In *leucorrhœa,* unconnected with inflammatory action, I have found tannic acid efficacious in restraining the discharge, and in increasing the strength of the patient. The aqueous solution, combined with a small proportion of dilute nitric acid, was the form usually employed in these examples of disease. In *menorrhagia,* not dependent on a plethoric state of the system, or on local congestion, it was also serviceable, administered in the same form.

The excessive *sweating in phthisis,* and in other diseases running on to a fatal termination, has been usefully restrained by the use of tannic acid, combined with dilute nitric acid; and the habitual cold damp upon the skin of soft, weakly constitutions has been corrected by the same means. I have had no opportunity of testing the virtues of this remedy in the *hemorrhagic diathesis;* but I am strongly disposed to believe they would be found very considerable, conjoined with other suitable means. I believe it would prove serviceable in *albuminuria,* dependent on chronic disorganization of the kidney, and not associated with obstructive disease. When the egress of albumen results, as I believe it often does in no small degree, from reduced tone and elasticity in the organ, and is not (as in a great majority of cases) a wholesome outlet necessary for the relief of the circulation, tannic acid offers the promise of benefit. Such a case, however, I have not lately met with, and consequently have not had an opportunity of testing the treatment.

Local application. In the form of aqueous solution, used as a gargle, tannic acid has been most useful in correcting relaxation of the throat. Sponginess and hemorrhage of the gums have been greatly controlled by a lotion of tannic acid, and by the application of the dry powder. By this means, loose teeth may be retained for a time, and the impediment to articulation thereby prevented, which would result from their removal.

In *prolapsus ani* I have prescribed tannic acid, dissolved in water, as an injection. This remedy is particularly indicated, when the disease is associated with great relaxation of the solids. Applied to *hemorrhoidal tumours,* free from inflammation, in the form of a fine powder, mixed with lard, it would doubtless prove more efficacious than galls, the usual remedy. It is assuredly due to the tannic acid which it contains, that uva ursi proves serviceable in *catarrhus vesicæ.*

In *gonorrhœa,* chronic or about to become such, tannic acid, applied externally as a lotion, has proved serviceable. In the latter mode, it has induced no smarting, although the parts have been tender, and though it has been applied with little intermission for several days. It is as a *local* astringent that tannic acid produces the most obvious effects, as Dr. Garrod has remarked.

Of tannic acid as an astringent, I have merely further to say, that it is of special excellence as an external application to the skin, when such a remedy is required. I have found it of extraordinary efficacy, when reduced to fine powder, mixed with lard, and applied to the skin. The parts soon acquire a healthy aspect; very little of the smarting or pungency is experienced, which so generally results from the use of the salts of alumina, lead, zinc, or copper. I have found it far superior to gallic acid.

2. As a *Peptic,* tannic acid is very efficacious. This I soon found, while employing it as a pure astringent. Symptoms of dyspepsia disappeared under its use, the appetite increased, flatus and sense of distension were abated at the same time: and, in several instances, the bowels, far from becoming constipated, acquiring a more healthy tone, actually became more free. A lady affected with phthisis, who has been under my care for three years, during which time she has taken tannic acid alternately with cod-liver oil, complained, very lately, of loss of appetite while taking the oil. The morning dose of the oil was replaced by tannic acid, combined with dilute nitric acid; and the result was a very striking restoration of the appetite. With such obvious improvement in the condition and action of the stomach, it is reasonable to believe, that one of the results is the formation of a more perfect chyle. The action, as a peptic, is in accordance with the statement of one of the best writers on Materia Medica. Dr. Pereira says, "Administered in moderate doses, they (astringents) promote the appetite, assist digestion," &c.

3. As a *Histogenetic,* in *promoting the genesis,* and in *improving the quality of the blood,* tannic acid, it may be inferred from what has been stated above, would probably prove effective. But that it is really so, I have the evidence of improved complexion, greater fulness of the blood-vessels, increase of strength, buoyancy of spirits, and improved secretions, in numerous examples of anæmic and other diseases, in which this agent has been long employed.

The *formation of structures in the young,* I have reason to believe, is subserved, to a valuable extent, by the long-continued administration of tannic acid, in moderate doses. It is nearly six years since I began to prescribe this remedy in cases of curvature of the bones in children, with soft shafts and enlarged epiphyses. The number of cases placed under this treatment, while I was physician to the Northern Dispensary, was considerable; and not a few occurring in private practice were similarly treated. The general health was improved in all. The secretions, in many cases exceedingly offensive, were greatly corrected. In the course of a year or two, an obvious improvement in the shape and form of the bones was manifest. The curve was reduced; and the heads of the bones had lost no small amount of their disproportionate prominence. I have lately seen two or three children, presenting no appearance of having suffered from this affection of the bones, who, some years ago, really were deformed, and who were put under the influence of tannic acid, and also, it is true, of suitable regimen. In most of these examples of disease, when they came under my care, the urine contained an undue proportion of lime. This continued to be the case, at least for some time, even under the use of tannic acid, though perhaps not to the same extent. If tannic acid really possess the power of correcting the tendency to rickets, or of staying the progress of this affection, it cannot be through any astringent action on the kidney arresting the exit of an undue quantity of lime, which is only a sign or consequence of the disease, and not its cause. It must act by invigorating the general health, and by imparting a more healthy character to the formative processes, by virtue of which lime and other mineral ingredients in the blood are

more forcibly attracted to, and fixed in, the osseous structure. Further evidence of the power of tannic acid to improve the formation of tissues, has been afforded by the increase in the volume and firmness of the soft parts of children placed under its operation, which I have frequently observed.

4. In connexion with *heterologous formations,* tannic acid has been largely employed in my practice; and as far as I can judge, and with every wish to be impartial, I believe it has been operative, to a great and valuable extent, in arresting or retarding their growth. Almost every case of incipient tubercular deposit in the lungs, which came under my care, either at the Northern Dispensary or in private practice, some years ago, was treated, at least in part, with tannic acid; and I have been agreeably surprised to find that not a few of these very patients are now alive, some apparently not nearer the grave than at that time, and some in really improved health. I was consulted in the case of a young lady, five years ago. The apex of the right lung was solidified with tubercle, and the patient had rapidly deteriorated. Sir James Clarke saw her with me, and Dr. Watson, at a later period, also visited her. Tannic acid was employed, after the more ordinary practice had been adopted; and though other means have been in use on different occasions, I attribute much of her present health to the acid. That lady's lung is still solidified, the respiration is bronchial, and percussion is absolutely dull; but the general health is equal to that of the other members of the family, and permits of her going abroad.

[Dr. Alison relates several other phthisical cases in which the tannic acid seemed to be of great service. He then proceeds to say:]

5. As a *Nervine* of a lasting character, I have found tannic acid useful in several cases of nervous debility, langour, and excitability. These distressing conditions have been relieved; and the benefit, in one or two examples, has been permanent. Under the use of moderate doses of this medicine, I have known even the symptoms of weakly organization,—or, as I have thought, of impending softening of the brain, such as flightiness of speech and manner, impatience of attention or of application, hasty judgments, weakness and unstable gait,—to lose not a little of their prominence. It has always, however, been my object to guard against depending on this or any other such remedy, where there has been good reason to suspect the presence of inflammatory action, even in a subdued form. When thus used as a nervine, tannic acid should generally be combined with camphor, hops, or hyoscyamus. The shower-bath has been employed, and the secretions have been attended to, at the same time. Thus exhibited, I believe that tannic acid, by improving the natural galvanic battery, if our brain and nerves may be so figuratively designated, will really, in many cases of feeble volition and muscular action, produce not a little of that benefit which has been sanguinely looked for from galvanism and electricity, and which, when obtained, has been so fleeting,—at least in my experience.

Mode of Administration of Tannic Acid. For administration, tannic acid is well suited. It possesses no great bitterness, is free from colour, and does not induce nausea. A little sugar or syrup will suffice to

cover all unpleasantness. It is perfectly safe, and may be continued for months without any evil effect. In moderate doses, it does not reduce the secretions below the healthy standard. It may be administered at all hours,—before, or during, or after meals.

Tannic acid may be employed alone in the treatment of disease; but it is capable of exercising its virtues harmoniously with other remedies. The use of this medicine does not preclude the employment of iron, cod-liver oil, and other such means; but, on the contrary, I believe it will make them more available to the patient. It may be given at one time of the day, and the other remedies at another; or a week or a fortnight may be given alternately to each medicine. Tannic acid, moreover, may be advantageously combined at the same moment with other means. It may be prepared with bitters and aromatics, or conjoined with astringent wines.

For diseases of the mouth, tannic acid may be dissolved in water: three or four grains to the ounce of water make a strong styptic lotion. It may be reduced to a fine powder, and dusted over the parts. Mr. Morson has prepared a lozenge, which is well adapted for the mouth and throat. Each lozenge contains about half a grain of tannic acid. Some have added to them essence of cayenne, the more to fit them for relaxation of the fauces and glottis. For the stomach, the aqueous solution is well adapted; and, when a pure bitter is required, some infusion, such as that of gentian, may be used instead of water. When it is intended to influence the bowels, tannic acid is suitably exhibited in the form of pill; and as circumstances indicate, in combination with opium or other remedies. If we desire it to enter the circulation, or to act quickly, at a distance from the stomach, on some internal part, the form of solution or powder should be employed. As a styptic for the rectum, uterus, vagina, or urethra, the aqueous solution, used as an injection, will generally prove most serviceable. For local skin diseases, requiring an astringent, tannic acid may be advantageously used, either as a lotion, or in the form of ointment. As, however, the application is really effective, it will be well to attend, at the same time, to any requirements that the general system may demand. Reduced to a very fine powder, I have found that tannic acid may be inhaled into the lungs and air-tubes. It has produced no irritation or cough, when tolerably well managed. I have not had much experience of it in this form; but I believe that a cautious trial might be made of it in cases of disease of the lungs and air-tubes, in which the local application of a non-irritant styptic is indicated.

The dose of pure tannic acid must vary according to the circumstances under which it is employed. For urgent disease, such as hemorrhage from the stomach, bowels, or lungs, five to ten grains should be used every few hours. For chronic fluxes, wherever situated, two or three grains, given twice a day, will generally suffice. When the general improvement of the health is simply desiderated, one or two grains, two or three times daily, are enough, but the remedy should be long continued. For children afflicted with rickets, half a grain to one grain answers well, given night and morning.

Tannic acid is contra-indicated in hemorrhages and fluxes, wherever

situated, which are only the relieving of an obstructed circulation, or of inflammatory or congestive action. It is, under such circumstances, calculated to do mischief. In obstinate constipation of the bowels, when circumstances render a lax state necessary, tannic acid is contra-indicated in large doses, as a general rule. Irritability of stomach and gastritis are liable to be aggravated by tannic acid.

Several preparations of tannic acid have been carefully prepared, at my suggestion, by Mr. Morson, the eminent pharmaceutist, of Southampton-row. These preparations are the tannates of quinine, cinchonine, alumina, bismuth, and lead. They are all coloured, possess more or less the styptic taste of tannic acid, and are inodorous. I have not yet had time to make sufficient trial of them, so as to be enabled to report at present upon their virtues. I shall now only hazard an opinion that they, as well as tannic acid itself, will be found, upon full trial, to possess very considerable power, and to form valuable acquisitions to the resources of the physician, wherewith he may render himself more formidable to disease, and still more serviceable to the sick.—*London Journal, Jan.* 1850, *p.* 1.

161.—OBSERVATIONS ON GANGRENE.

By G. J. Guthrie, Esq., F.R.S.

[After mentioning the terms ordinarily used to express varieties of gangrene, as *dry*, *humid*, and *traumatic*, Mr. Guthrie says:]

These words or terms do not convey to the mind of the surgeon any real practical distinctions, yet practical distinctions are the points required; and to effect this object I have made one which is on many points of the greatest importance, because it leads to an essential difference of practice—viz., into *constitutional* and *local*. Surgeons have, I am aware, spoken and written of chronic and idiopathic mortification, or certain states depending on internal causes, which have occupied a considerable time before they gave rise to any great development of evil; whereas the difference between local and constitutional mortification may depend on a few hours—a time so short, and yet so precious, that it becomes a matter of life and death in many instances. The *carpe diem* of Horace is in no case more applicable.

Constitutional gangrene may be humid or dry, whether it arise, as it were, idiopathically, following a spontaneous inflammation, or in old age, in which it appears almost as a first symptom. Local mortification may be either humid or dry, although, when it is humid, it arises chiefly from the warmth of the applications by which it is surrounded, causing it to be also the commencement of the process of putrefaction, whilst, if left to itself, or nearly exposed to the air, it would become shrivelled and dry.

Examples of humid, or the common kind of mortification, following erysipelas, are seen sufficiently often in all hospitals to render a description of it here unnecessary, and I shall confine my observations to local mortification only. The purest example of local mortification is when it occurs from the supply of blood being cut off from the foot by the

division of the great vessels in the thigh. The preparation I now present to you is unique. It shows the right femoral artery and vein of P. Turnbull, of the grenadiers of the 74th regiment, between which a ball passed, in the spot you see marked, on the 10th of April, 1814, at the battle of Toulouse; the coats of the artery and vein being little injured, those of the artery not destroyed in substance, although bruised; they are filled above and below with coagula. This preparation is perhaps the only one in existence proving the great elasticity of these vessels, and their capability of bearing, to a certain extent, an injury without being torn, although it may have been sufficient to cause inflammation, as it did in this case, with obliteration of their canals. The case was mistaken, in the first instance, and shown to me, on the 18th of April, as an extraordinary instance of gangrene occurring without sufficient cause.

[After detailing the particulars of this case, Mr. Guthrie relates one with which he met in London some years afterwards, in which his recommendation of amputation was not attended to by the surgeons who had charge of the case. Mr. Guthrie says:]

The surgery of London was not, however, as far advanced in 1823 as the surgery of Toulouse in 1814. In the first place, these gentlemen did not know that the lower end of the femoral artery, when wounded, always bleeds black blood, not scarlet, like its upper end, so that you may have, and will have, two kinds of blood from the two ends of the same artery. This was a fact well known on the banks of the Guadiana, the Tormes, and the Garonne, but not on those of the Thames. So it was with the equally important fact, that arresting the flow of blood in the upper part of an artery would not prevent its bleeding if wounded, at its lower part. Two points so admirably exemplified in this case, and of which I believe there are few, if any men of education who at this moment doubt.

The third point, or that of the first appearance of mortification, is not so fully acknowledged, and that because it is not understood. The accident is not seen as often in all England in seven years as it was in a day in the plains of Estremadura and Castille. The existence of mortification is not acknowledged, because the part is neither *red* nor *black*, which it is presumed all mortifications ought to be. It is, in reality, the reverse, or *quite white*. It is as bad a thing in chirurgery as that *rara avis*, a black swan, was formerly in ornithology.

In all cases like those I have referred to,—and I have reported many in my record on wounded arteries,—the foot first suffers, and the failure of the circulation is usually remarked in the great toe, or in the ends of the other toes. It may so remain for days, and then extend as far as the instep, or ancle, when it frequently stops for a short time, and then proceeds as high as the calf, after which life is soon destroyed. In many cases the extension of the mortification is more rapid at the beginning, and soon proceeds as high as the calf of the leg, at which part nature seems often to make a great effort to resist its further progress. The fact I state; the cause, I presume, must depend on the circulation around the knee, but whether that be the right one or not you must

receive it, for the very lady-like reason that it is so, and that you have not for the present a better reason to adopt. It is on account of the fact that I have selected this part as the one at which amputation should be performed, before many people would know why it should be done at all, who overlook the wound of the artery in the thigh, or who do not understand the baneful influence it exerts on the parts below. Amputation at or above the middle of the thigh is a very dangerous operation at all times, and a very unsuccessful one in all cases of wound of its artery, accompanied by mortification of the foot and leg. The person does not die under the operation, but the stump does not take on the action necessary for his recovery. The mortification had become constitutional instead of being local before the operation was done. The stump swells, opens out, looks white, and discharges usually but little, and never healthy matter. The system generally suffers in proportion, and the patient rarely survives beyond three or four days, if he live so long. To prevent this result, amputation is to be performed as soon as mortification is so established as to be no longer doubtful, Under the most favourable circumstances the person must lose his toes, or his foot at the ancle, and an amputation a little higher, leaving room for an artificial leg, does not make the matter worse, more particularly as the cases of recovery, with the loss of the toes or the foot at the ancle, are not forthcoming, to prove the propriety of doing nothing, or of waiting for what is called a line of separation.

The patient is not aware of anything being abnormal in his foot, the sensibility and capability of motion being nearly as natural as usual. The temperature of the part, under the ordinary circumstance of being in bed, is scarcely diminished—often not perceptibly so to the touch of the observer; and when it is less, it is not beyond a degree or two of the thermometer. It is the change of colour which marks the commencement of the mischief to the initiated. The flesh-colour has changed to the white of a bad tallow-candle; and as the mischief advances on the instep to the leg, this white becomes spotted like the best mottled soap. It does not turn a red or purple black, like that of a humid mortification, unless the part putrefies under the application of hot poultices, &c., but gradually shrinks and dies. The long tendon of the great toe seems to stand out along its back, and the skin becomes brown over it, and shrivelled. The person, nevertheless, can bend and extend the toe, and feel and describe his sensations when it is touched. There is no redness at first, marking the spot beyond which the commencing mortification does not extend; there is merely the difference between the natural and the altered colour of the parts. This is followed by some little swelling and slight redness, the precursors, in general, of the further progress the mortification is about to make. As time passes away, the course of all the tendons in the foot is marked by the discolouration of the skin over them, and the whole skin gradually becomes browner, dark-coloured, and dry, unless artificial heat changes the chemical action going on in the part, dead as to circulation, but yet alive as to motion and sensibility, although both are at this period impaired.

This mortification is local, in the first instance; how long it may remain so depends, in a great degree, on the excitability of the constitu-

tion of the patient, and is of longer or of shorter duration. There is always, however, I shall say, as a general rule, sufficient time for its continuance as a local disease, to allow of the commencing mortification being clearly perceived, and its probable extent ascertained, at an early period.

What, under these circumstances, is the precept to be followed? Is it the old Hunterian one, of waiting for the cessation of the mortification, under the means employed, and the formation of a line of demarcation between the dead and the living parts, when an amputation may be performed, but which time rarely arrives before the patient dies? or is it the precept I have laid down for you, of amputating immediately, and below the knee? My decision is for the latter, and I hope it will always be yours.

I must impress upon you, however, that although mortification too frequently follows an injury of the main artery, when suddenly committed, and without any previous disease in the limb, it does not always do so; and that attention to the direction I have elsewhere given, of keeping up a gentle but continual friction, by the hands of assistants, on the lower part of the extremity in danger, may tend to prevent it. It is a proceeding which should never be omitted in any case where a doubt exists as to the probable occurrence of the mischief which may be expected.—*Lancet, April 6*, 1850, *p.* 401.

162.—ON THE PRODUCTION OF FAT.

By Dr. Thomas K. Chambers.

To determine what portion of the digestive apparatus, and which of its secretions are most concerned in the appropriation of the fatty elements of the food, has lately been made a frequent subject of experiment. That the stomach has nothing to do with it we should have conjectured, from our knowledge of the functions and usual state of that organ. The acid mucus secreted by its walls has no effect on oily substances. The large quantity of fluid which it generally contains keeps the globules of fat floating free in the cavity, without touching its mucous membrane. The nitrogenous principles, and all substances capable of being acted upon by the gastric juice, and being made soluble in water, fibrin, starch, sugar, &c., are probably taken up, to a certain amount, by the veins of the stomach. The alimentary mass thus passes out of the pylorus in a more concentrated form, and containing a larger proportionate quantity of fat than the food eaten. Thus, M. Boussingault found that rice taken from a duck's gizzard contained much more oil than the same rice before it was eaten; and in the small intestines, the chyme held nearly five per cent. of the substance, while rice presents only a few parts in a thousand.

But in the duodenum, the chyme is mixed with two fluids, the bile and the pancreatic juice, both of which have with much reason been supposed to act chemically on fat. Stale bile is well known to dissolve oil by its alkaline reaction, and the use of it in removing grease spots from woollen textures is familiar to all dyers and scourers. But it is question-

able whether in the body, and free from the gall-bladder mucus, it is alkaline, as it is seen to be after death. Our knowledge must be derived from living, not dead bile. Sir Benjamin Brodie deduced, many years ago, from experiments made on the bodies of cats, that the bile does dissolve fat; but in these animals the ducts of the liver and pancreas anastomose, so that he had no opportunity of separating the actions of the two secretions. He proves that the two jointly render fat capable of being taken up by the lacteals, but does not test their distinct powers. Indeed, in most animals that is impossible.

However, in the rabbit, a strange freak of nature presents the desired opportunity. In it, the ductus choledochus empties itself close to the pylorus, and the pancreatic secretion enters the intestinal canal eleven or twelve inches lower down, the duodenum being singularly long for an animal so small. By feeding a rabbit on a meal of fatty substances, after a previous fast, and killing the animal about three hours afterwards, while the mass may be supposed to be passing gradually through the upper parts of the bowels, we are able to observe, first, the effect of the admixture of bile, and, twelve inches lower down, of the pancreatic fluid on the fat taken. Were the fat dissolved by the bile, evidence would be exhibited of the fact by its being taken up into the lacteals, and producing in them the well-known milky appearance. But in the specimen which is here submitted to you, it may be seen that such is not the case; the lacteals are filled with clear fluid, till we come to the entrance of the pancreatic duct. Immediately that is passed, you see them leaving the intestines in great quantities, as white as milk. It is, therefore, the pancreatic juice which renders the fat of the food capable of being absorbed by the lacteals.

The pancreatic juice has yet a further action on one of the elements of the food, which bears a certain relation to the subject we are considering; it is capable of converting starch, by digestion, for an hour and a half, at 86° Fahr., into dextrin and sugar. This observation, originally made by Bouchardat, has been confirmed by Frerichs, (l. s. c). Now, in an inaugural treatise, published in 1845, at Halle, by Dr. J. H. Meckel, entitled 'De Genesi Adipis in Animalibus,' the author has brought forward some evidence, which induced him to believe that sugar may be converted by the bile into the oily acids. If his conjectures are correct, starch may be converted into sugar by the pancreatic juice, and that sugar into fat by the bile. Thus we have the transformation of amylaceous substances distinctly traced, and the use they are of in supplying adipose matter to the system explained. And we shall thus understand the results of experiments, where starch was found to fatten. It is right, however, to say, that these experiments of Dr. Meckel's have not received confirmation from any one who has specially devoted himself to the study of chemistry.

As soon as fat has passed by the lymphatic circulation into the blood, it seems to be very rapidly appropriated to the purposes for which it is designed, for in the healthy vital fluid very little is to be found. That quantity which can be discovered is much altered in character and chemical behaviour. Some portion of it is in union with phosphorus; and as that substance is more likely to be part of some destroyed tissue than to

be derived from the food, it is a more probable conjecture to suppose the fat it is united with, to be the result of destructive than of nutritive absorption. A further evidence in favour of the conjecture which I have ventured to throw out, is afforded by an experiment before cited of M. Boussingault, who found that in ducks fed with lard the quantity of fat in their blood did not exceed that which existed in the blood of the same animals when killed after having been for some days without food. But the rapidity with which it leaves the blood, and the slight trace found therein, is no evidence that it has not gone through that common thoroughfare where the passengers in and out of the body meet in their journeyings. What is more certain than that the sugar of diabetic urine all comes ready formed from the circulating stream? Yet how little is found in the source!

Once in the blood, the fat may be consumed for the purposes of the respiration; or it may be stored up in the vesicles prepared for its reception, into which it is poured after the manner of a true secretion.—*Lancet, May* 18, 1850, *p.* 582.

163.—ON THE ELECTRICITY OF THE AIR.

By Prof. FARADAY.

[At a recent lecture at the Royal Institution,]

Professor Faraday introduced and expounded the hypothesis of M. Pelletier, respecting the electrical relations of the earth and its atmosphere to the planetary space in which it moves.

The mode in which the electricity of the atmosphere was discovered by MM. Pelletier and Quetelet, was shown by Dr. Faraday experimentally. The instrument employed by these investigators was a brass globe placed on a thin metallic stem, to which is affixed a delicate galvanometer needle, which indicates, by a minute measurement in degrees, the amount of electricity obtained. This instrument was used by the experimentalists on the summits of high buildings, where it was above every surrounding object. The method formerly adopted was to employ for this purpose a long metallic rod, furnished with points which projected into the air to be examined. M. Pelletier's mode gives the quantity and the kind with certainty, while the old method furnishes uncertain and often contradictory results.

Dr. Faraday illustrated, by enlarged models, the influence of various degrees of elevation on M. Pelletier's electrometer; at the same time showing that no changes take place from variation of position when the instrument is moved horizontally, and that thus throughout each stratum the electricity of the air is the same. It is the vertical elevation or depression which produces a marked difference. The results obtained by M. Pelletier, are—

1. That the electricity of the air increases directly with the distance from the surface of the earth—a fact of great importance, as it influences the determination of the question whether the electricity of the earth be derived from planetary space, as Pelletier affirms, or whether, as Professor Faraday thinks, it be the result of various processes taking place on the surface of the earth.

2. The measure of divergence of the electrometer being the measure of force, it was found from a series of daily observations extending over a period of five years (1844-8), that the quantity of electricity at the same place undergoes a regular increase and decrease in certain months of the year; that contrary to general belief, the quantity of electricity is at its maximum in winter, and undergoes a decrease until it finds its minimum in June, and then again arises to its maximum in the succeeding January.

The subjoined table represents the numerical results; and from this it will be seen, that at the same level, the quantity of electricity in the atmosphere is twelve times as great in the cold month of January as in the hot month of June.

Average of Five Years, 1844-8.

MONTHS.	QUANTITY OF ELECTRICITY.
January (maximum)	605
February	378
March	200
April	141
May	84
June (minimum)	47
July	49
August	62
September	70
October	131
November	209
December	507

3. *The influence of the state of the sky.*—From the results under this head it is made evident that the highest degree of electricity is not found in cloudy weather, but in the clear serene sky, *i. e.* at a time when the atmosphere is free from clouds. Thus for the whole year the proportioned *quantity* may be represented: cloudy 186, clear 273. In reference to the monthly variations, as influenced by the state of the sky, it was found that in January, the maximum month of the year, the proportionate quantities are, cloudy 268, clear 1133. Only one exception, for an equal number of cloudy and clear days, was met with to this rule, viz., in July: the electricity on the cloudy days was 41, on the clear days 35.

4. As regards fog, snow, and rain, it was observed that the amount of electricity was the same during the two former states of weather, and was double that observed during rainy weather. The latter corresponding to the minimum of the annual electricity, the former to the maximum of the year.

5. *As to the kind of electricity in the air.*—It was noted that during a period of five years, only twenty-five observations gave evidence of resinous or *negative* electricity; the rest, consisting of 1800 observations, indicated vitreous or *positive* electricity. The negative observations were all recorded after storm or rain, or some other great meteorological change. The normally electrical state of the atmosphere may therefore be considered as *positive*.

6. *Wind.*—It was observed that when the wind was E.S.E., or S.E., two *maxima* were regularly formed, and two *minima* when at W.S.W., and that these corresponded with the other variations which have been mentioned.

7. The diurnal variations were recorded during the same period of five years, from six o'clock in the morning until nine at night. The degrees of divergence showed that there were two maxima and two minima daily. The maxima were at 8 A.M. and from 8 to 9 P.M., corresponding to the maxima of barometrical elevation, but in opposite periods to the magnetical maxima. One minimum was from 2 to 4 P.M., the other probably during the early morning hours.

All these great and regular phenomena of the atmospheric electricity, Dr. Faraday observed, are phenomena of *static electricity,* while the thunder-storm, the St. Elmo light, &c. &c., are the exceptional instances of *current* or *dynamic electricity;* not necessarily, however, requiring clouds for its concentration or evolution.

The Professor concluded by expressing his dissent from the theory of M. Quetelet, that the electricity of the earth was negative, and that of planetary space positive. According to this theory the only true electricity is the negative, *i. e.* that produced by the friction of resinous substances, while the positive electricity is merely the absence or negation of electricity. It thus reverses all our common notions of electrical science. Dr. Faraday observed that while admitting to the very fullest extent the value of the observation and investigations of MM. Pelletier and Quetelet, which he had brought before his audience, he nevertheless could not receive the hypothesis they had framed thereon.

(These researches on the electricity of the air are not only interesting in a meteorological, but in a physiological and pathological point of view. While they account for storms in cloudless skies, and for the occurrence of severe storms during winter, or in very cold latitudes, as at Cape Horn, for instance (the Cape of Storms), they tend to throw light upon the exacerbations of disease at different hours of the day, as well as on the increase and decrease of epidemic and other diseases in different months of the year. Such remarkable changes in the electricity of the atmosphere cannot go on without affecting the static electricity of the human frame. According to the researches of Casper, the greater number of deaths from disease take place at the early hours in the morning, when the quantity of electricity in the air is reaching its minimum. Is this merely a coincidence, or is there some yet undiscovered connexion between the cessation of life and the electrical state of the medium in which the human body is placed?—Ed. Gaz.) –*Med. Gazette, Feb.* 8, 1850, *p.* 255.

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164. *On the Nature and Properties of Ozone.*—This peculiar substance, the nature of which is yet far from being understood, has recently attracted much attention on account of its supposed connexion with epidemic diseases. M. Schoenbein, of Bâle, has submitted it to some new experiments, the results of which were communicated by M. Becquerel, at a late meeting of the Academy of Sciences.

M. Schoenbein procures ozone in large quantities, by enclosing a small quantity of water in a balloon having a capacity of ten to fifteen quarts. Small bits of phosphorus, of one centimetre in diameter, are then placed, half in the water, half in the air of the balloon; the latter is closed imperfectly, and its contents raised to a temperature of 60 to 68 degrees Fahr. When the operation is completed,—a circumstance readily known by the peculiar smell of the air in the balloon, the latter is turned down over water to get rid of the phosphorus, and then agitated to wash the compound. A cork, supporting two tubes, is now attached to the balloon, and through one tube some water is introduced, while the other gives exit to the ozone. This substance, when concentrated, has an odour resembling that of chlorine; when mixed with air, it gives out an odour like that emitted from an electric machine, while in motion. Air, thoroughly charged with ozone, produces some difficulty of breathing, and, according to M. Schoenbein, is often the cause of catarrhal affections. Small animals placed in it die quickly. Ozone is insoluble in water; it destroys rapidly organic colouring matters, as well as those having albumen and ligneum for their base. According to the author, it is the substance which has the greatest affinity for oxygen of all known bodies. As it is invariably produced in the air by the action of artificial electric discharges, it must be produced in the atmosphere under the influence of the same cause, when natural. Nothing is more easy than to determine the presence of ozone in the atmosphere, and the variations of quantity it presents. For this purpose we have merely to test the air with some paper impregnated with a solution of sulphate or muriate of magnesia. The ozone decomposes the salt rapidly, and the paper assumes a brown tint. Generally speaking, this action on the paper is found to be stronger in winter than in summer. M. Schoenbein observed, that it was always stronger during falls of snow than at any other period. Up to the present moment this curious body has defied chemical analysis. M. Marignac thinks that it is a peculiar modification of oxygen. M. Schoenbein regards it as a bis-oxyde of hydrogen, or a substance probably containing a greater quantity of oxygen than oxygenated water. ('Gaz. Méd.')—*Med. Times, Feb.* 16, 1850, *p.* 119.

165.—ON THE DIFFERENTIAL DIAGNOSIS OF GOUT AND RHEUMATISM.

By Dr. A. B. Garrod.

[At a meeting of the Westminster Medical Society, Dr. Garrod made the following remarks on the differences between gout and rheumatism:]

Gout is a disease of advanced age; rheumatism, of youth. Gout is more common among men; rheumatism affects both sexes alike. Gout, at first at least, attacks the plethoric, and those who live high; rheumatism, generally the debilitated from any causes. Gout is frequently hereditary; rheumatism, if at all so, incomparably less so than gout. The exciting causes also differ. Gout is induced by high living, certain indigestible food, or by local injury in those strongly predisposed; cold is

the principal exciting cause of rheumatism. The rich are more subject to gout, the poor, to rheumatism. Gout frequently presents premonitory symptoms, affecting the digestive organs, which is not the case in rheumatism. Gout attacks the small joints; rheumatism the larger. In gout, one joint, generally, only is affected; in rheumatism, many. In gout of long standing the large joints may be attacked, and also more than one; sometimes, again, in rheumatism, the smaller joints are involved. In both diseases the affection of the joints is accompanied by pain, redness, and swelling; but in gout the pain is generally more severe, and the redness and swelling greater than in rheumatism. In gout we have œdema and subsequent desquamation, which do not occur in rheumatism. The fever in gout is proportioned to the local inflammation; but it greatly exceeds it in rheumatism, and there is frequently profuse sweating, of an acid character. Metastasis rarely occurs in acute gout, and when it does, the brain or stomach suffers, the heart seldom or never; in rheumatism the heart is frequently inflamed, and the secondary affection becomes the most important. Chronic rheumatism is more frequent than chronic gout; the latter is frequently accompanied by the secretion of a milky fluid, which constitutes chalk-stones or tophaceous deposits. Their composition is peculiar, consisting almost entirely of urate of soda, and sometimes of phosphate and carbonate of lime. In the fluid state the needle-like crystals of the urate of soda can be readily detected under the microscope. They are met with on the joints of the hands and feet, which they distort, and even dislocate; also in and around the sheaths of tendons, and even in the cancellated structure of the heads of the bones.

Colchicum possesses an almost magic power in relieving the pain in gout, but is not attended with such marked benefit in the acute form of rheumatism. There are, however, a class of cases in which, even with the utmost care, the diagnosis cannot always be made. These are called rheumatic gout; and it would seem either that the patient suffered from both diseases at once, or that the two merged into one. Dr. Garrod considers it a matter of great interest to ascertain the true nature of these cases, and to find out whether or not cases of true gout and those of rheumatism may not present similar and almost identical symptoms, and yet in their real nature be quite distinct. In a paper read before the Medico-Chirurgical Society, Dr. Garrod proved the existence of uric acid in the blood; in the healthy fluid traces of it only could be found, but in pure gout it was greatly increased, so that from 1000 grains of serum it could be crystallized and weighed. It could also be procured in the form of urate of soda. This is not the case in acute rheumatism, and in that disease no more uric acid is found than in the healthy fluid. This, then, forms a marked difference between the two diseases. Uric acid, in Dr. Garrod's experiments, was abundant in the blood in cases presenting symptoms of true gout, deficient in those of well-marked rheumatism. This he used lately as a test of the two diseases. A labourer being admitted into the hospital with a complaint in one hand, which had been previously treated as rheumatism, but presenting characters of gout, as Dr. Garrod supposed, he directed a small quantity of blood to be drawn, and discovered uric acid abundantly. The man afterwards said he had had a similar attack in the toes, and that he could at any time bring on an

attack by drinking beer freely. The plan for detecting uric acid in the blood detailed in the paper read before the Medico-Chirurgical Society being very difficult, Dr. Garrod recommends the following, as being more simple:—He takes a small quantity of blood, say from half an ounce to an ounce, in a wide tube or small glass, and allows it to remain for some hours, to separate into clot and serum. The serum is then decanted, and from half a drachm to a drachm put on a watch-glass, then acidulated with five minims of acetic acid, and a fibre of hemp from a piece of linen or tow introduced. In about forty-eight hours, when the serum has become solid from evaporation, if uric acid be present, the fibre will be covered with crystals of uric acid in the form of rhombs. An idea of the amount of uric acid present may be obtained from the number of crystals.

That these crystals are uric acid can be proved by adding a little water, when, by care, the fibre can be removed with a small pair of forceps, with the crystals adhering to it. Nitric acid and ammonia will at once determine their nature, by the production of the murexide or purpurate of ammonia. Dr. Garrod then mentioned, as an indication of gout, the presence of chalk deposits in the ear,—a sign he has often observed. Sir C. Scudamore gives the tophaceous deposits as being only ten per cent., but Dr. Garrod has met with them in the ear much more frequently, so much so as in chronic cases to form a valuable sign of diagnosis. He has himself often diagnosed the disease from this mark alone, and found his opinion confirmed afterwards by the discovery of uric acid in the blood. In many cases of chronic gout the condition of the urine will aid the diagnosis; and when there are tophaceous deposits, the kidneys appear to have lost the power of excreting uric acid, so that the urine is at all times free from lithic deposits. When the chalk-stones are formed very freely, he has often found that not 1-100th of a grain of uric acid was eliminated in the urine in the twenty-four hours. At the same time, the urine may present an acid reaction.—*Med. Gazette, March* 22, 1850, *p.* 507.

166.—CASES OF SYPHILITIC LEPRA, WITH OBSERVATIONS.

By Erasmus Wilson, Esq., F.R.S.

[The first case detailed is the following:—In January, 1846, Mr. Wilson was consulted by a lady who was the subject of an eruption of syphilitic lepra. The lady, previously quite healthy, was married in March, 1845, miscarried in August, and in October was attacked with the eruption and sore throat. The husband had suffered repeatedly from venereal sores, the last of which occurred five months before marriage: he was mercurialized, and the sore healed; and for two months before his marriage he believed himself to be quite cured. He had never had any secondary symptoms. Mr. Wilson thus remarks upon the case:]

Let us rest for awhile from pursuing the case further, and examine its features as far as we have gone. A gentleman in the prime of man-

hood is saturated with syphilitic poison; the outward sign of the disease, the sore, gets well; he is saturated with mercury; the effects of the mercury subside, but, like the Leyden jar, in its relation to the electric fluid, he is still charged with the syphilitic poison. He marries, his secretions being contaminated with the syphilitic poison; these secretions are absorbed by the fresh organism into connexion with which they are brought, and his wife becomes a new focus of disease.

It may be asked—Why, in a man whose blood is saturated with syphilitic poison, does the primary sore get well?—or, Why do not other sores appear?—or further, Why do not secondary symptoms of a necessity occur? The answer is obvious; the tissue of the original sore is no longer susceptible of stimulation by the poisoned blood which is brought to it for nutrition. For the same reason, the surrounding tissues are equally insusceptible. For the same reason, the skin and mucous membranes are also insusceptible of its stimulus. Mr. Lane, in his excellent lectures, published in 'The Lancet' in 1841-2, has stated his opinion that the syphilitic poison is cumulative. I believe it. He has also put forth an original and beautiful idea with regard to this poison; and this also I firmly believe. It is, that the poison is conveyed away more or less actively by the natural emunctories of the system. Now, in the case before us, although the man was saturated with the syphilitic poison, that poison was kept down to a certain point of pressure, so to speak, by the excreting organs; but if any cause of derangement of the excretory system had taken place, then the excess of poison would probably have burst forth in the form of sore throat and cutaneous eruption. Certain persons are insusceptible of secondary or constitutional symptoms; but such persons may be so, not because they have not absorbed the syphilitic poison into all their tissues, but because their excreting organs carry off the poison as quickly as it is produced.

It may be asked, How it happened, in the case before us, that the poison continued in the system of the man after he had taken mercury to the extent of producing its constitutional effects? Why did not the mercury neutralize the syphilitic poison, or why did it not supersede the syphilitic ferment by its own specific action? In replying to these questions, I would first remark, that it is clear that the mercury did *not* effect any such purpose, and in continuation I would add, that mercury possesses no such power. I agree with Mr. Lane, that mercury has no specific power in syphilis, and that its influence in removing the virus from the constitution is entirely due to its property of increasing the activity of the excreting organs. To attain this object, mercury is never required to be carried to the extent of salivation, and whenever it is so used, it is calculated to be injurious rather than beneficial to the system. Adopting this theory in the present case, it is evident that the mercury was not continued for a sufficiently long time, and that both time and power were lost by the induction of salivation.

Another fact, which, as it appears to me, is proved by this case, is the absorption of the poison by the wife, without the intervention of a venereal sore, and, as I believe, by the general surface of the mucous membrane. It is no new fact that mucous membranes are absorbent surfaces, and it is perfectly consistent with physiological action, that a

poison presented to the surface of a membrane, like that of the vagina, and lying in contact with it for some time, should be absorbed. There appears to me to be no necessity for supposing that a particular spot of that membrane should be specially modified, and so give rise to a syphilitic sore. Where the poison is in a concentrated form, as when contained in the immediate secretion of a venereal sore, and when such secretion lies for a time in contact with a particular spot of mucous membrane, a venereal sore is to be regarded as a natural result; but where the poison is in a state of dilution, and diffused through a quantity of fluid, such as the seminal and vaginal secretions, there a sore appears to me to be unnecessary. I have pursued this argument to a certain length, because I am prepared to be met by some such reasoning as the following:—It is true that the patient may not be aware of the presence of a venereal sore, but such an one exists; if it be not present on the external organs, it may be higher up in the vagina, or on the cervix or os uteri. I am ready to admit that a venereal sore may be situated on the cervix or os uteri, indeed, I have seen such sores in that situation; but I am nevertheless of opinion, that in the present case, and in others of a similar kind, that I have had the opportunity of observing, there was no such sore in existence.

The syphilitic poison, like some other animal poisons, probably acts as a ferment in the blood, and is generated by a process similar to that of the production of yeast. Hence it requires an amount of time, differing in different constitutions, to acquire a bulk and force sufficient to react on the system; the time necessary for this purpose being increased, be it remembered, by the continued action of the emunctories before mentioned. In the case of the lady before us, the poison was probably absorbed during the early days of marriage, but it was not until three months after marriage that it first began to show its influence on her constitution by producing that state of disordered health which I have elsewhere termed syphilitic cachexia—namely, the low spirits, the feelings of languor and illness, the disordered state of the alimentary system, and the muddy and discoloured skin. The next action of the syphilitic poison was peculiarly interesting, and, to my mind, illustrates one of the special phenomena of syphilis—namely, its proneness to attack new tissues, and newly-formed parts, to involve in its own action parts that have not hitherto felt its effects; it seized upon the embryo, and destroyed its vitality, and the result was miscarriage.

This disposition to the attack of newly-formed textures by syphilis I regard in the light of an established law; and by means of this law, I should explain the violent effects produced on the constitution by syphilis after mercurialization has been effected. The action of mercury is to remove old parts with rapidity, while nutrition is engaged in replacing them by new; these new parts are seized upon by the syphilitic virus, and, possessing a lower degree of vitality than those which surround them, fall an easy prey to destruction. Hence the frequent occurrence of phagedæna after mercurialization, and hence, also, the destruction of the palate and mucous membrane of the fauces; and more, when the action of mercury has been carried too high or has been too much prolonged.

After the miscarriage, my patient went to the sea-side, and got well —in other words, the emunctories being restored to their healthy action, carried off from her system the syphilitic virus more speedily than it was formed, and she was in a fair way of getting thoroughly freed from the dangerous poison which lurked in her blood. Her husband, too, was absent, so that the supply was cut off, while the outgoing action was in full activity. This happy state of things endured only for a short period; she returned in September, she was again poisoned, and in less than a month syphilitic cachexia was re-established, and she became the subject of secondary symptoms, sore-throat, cutaneous eruption, and swollen and tender lymphatic glands. From the beginning of October until the middle of January, more than three months, she had been suffering in this state of disease without amendment, and without hope, and without, indeed, a knowledge of the nature and cause of her complaint, when she first came before me.

My treatment of this lady was very simple. I enjoined her to avoid sexual excitement, and gave her several powerful doses of calomel and colocynth at intervals of three days, exhibiting on the intermediate days, and until her secretions became healthy, the nitric and sulphuric acids, with a bitter infusion. I then gave her, for a short period, and until she complained of a metallic taste in the mouth, small doses of blue pill with opium; and I concluded my treatment with nitro-muriatic acid in small doses, and infusion of gentian. The suitability of this treatment to the emergencies of the case was apparent in the fact, that in five weeks after its commencement every trace of the cutaneous disease had disappeared, and she was perfectly well.

[In February, 1847, the lady consulted Mr. Wilson again. She had been confined in the previous November, and since her confinement had noticed some leprous spots on her abdomen, and slight soreness of the throat. The baby also presented a number of spots similar to the mother. In March, 1848, the lady again appeared with another child six weeks old, which was affected with various syphilitic symptoms. The mother, after being quite cured of the previous attack (as was also her child) had perceived a few fresh spots before her second confinement, but these had disappeared in a few weeks. Mr. Wilson prescribed treatment for the mother similar to that used on the former occasions, and appropriate remedies also for the child; and, under the influence of these means, both recovered.]

Observations.—In the foregoing case it is evident that the syphilitic poison was maintained by two young married persons for three years, and at the conclusion of this period the poison was probably as active as it had been at first. It is natural to inquire how many years longer it might be expected to continue. Upon this point we have no satisfactory evidence. Another question that suggests itself is, was the poison maintained by the male or by the female separately, or was the disposition to its formation the result of the connexion constantly taking place between them? It is obvious that in the first instance the poison originated in the husband, and for some time afterwards was conveyed by him to the wife. Subsequently it is possible that the tissues of the wife may have taken

on the poison-generating action, and the mutual connexion subsisting between them have kept both sources in a state of activity. But I am quite of opinion, that if they had ceased to have intercourse, the poison would by degrees have been eliminated from the system of both. These considerations raise a new question—namely, as to the influence which the stimulus of pure sexual intercourse may have in keeping up the poison-generating action in persons who have at some previous period been inoculated with the poison of syphilis.

The children in this case afforded a corroboration of the views which I have now put forth. In the first instance the poison was new to the tissues of the mother, and acted violently upon them and upon the new organic being which was undergoing development in her womb. The consequence was, abortion. In the case of the second conception, the virus was as it were naturalized; its stimulant properties were subdued, and it spread through the embryo and fœtus without producing any abnormal action. The mother at this time was well; less poison was probably generated in virtue of the developmental action in operation in her economy; besides, the emunctories were performing their office healthily. The child was consequently born in good health, and it was not until a new influx of poison had taken place from husband to wife, and then to the child, that the latter became affected. This influx may have been the natural result of the restoration of suspended intercourse; or it may have been the consequence of some derangement of function in the economy of the mother that checked the action of the emunctories or increased the energy of the morbid ferment.

The third child was differently circumstanced; it was born while the mother was yet suffering under secondary symptoms; shortly after certain spots had dispersed and while an excess of poison was present in her system. The child, consequently, bore traces of the disease on its hands and feet at its birth; and soon after, the causes which affected the other child coming into action, it betrayed a more serious invasion of constitutional syphilis. In what other way can we explain a second living child suffering more severely than the first; in other words, the syphilitic virus being more potent in 1848, than it was a year earlier, in 1847.

The subsequent history of these children developes the argument still further. They are weaned from their mother; they no longer draw poison from their mother's milk; the functions of nutrition and secretion are healthily performed, and they throw off the poison entirely, and become fine children. This, unhappily, is not always the case; sometimes the poisonous ferment takes up a permanent abode in the blood; it interferes with nutrition and sanguification; induces a state of the system favourable to the development of organic diseases of various kinds; or lays the foundation for scrofulous degeneration, and all its serious consequences.

The more common form of manifestation of constitutional venereal disease in infants, is, for the skin:—excoriation and fissures around the apertures of the body, the seeming consequence of acrid humours; erythema of the feet and hands, with epidermal exfoliation; and small circular and slightly elevated spots, with depressed centres, looking like lepra, in process of peripheral extension, and without its scales. For the

mucous membranes:—there is an acrid discharge from the eyes, nose, and mouth; moist excoriations at the angles of each of these apertures; aphthæ, and congestion of the mucous membrane of the mouth and fauces; a clogged state of the air-passages; tumefaction of the membrane of the trachea and larynx; and, not unfrequently, diarrhœa. The following case will illustrate these symptoms more particularly, and show the manner in which constitutional syphilis, in infants, commonly exhibits itself.

Case.—In the autumn of 1849, a lady brought to me her infant, aged fourteen weeks, to obtain my opinion with regard to an eruption on the skin, under which the little sufferer had been labouring more than two months. She stated that the spots had made their appearance, in the first instance, on the heels; that they next showed themselves in the cleft of the buttocks, and extended to the legs; and that, subsequently, they came out on the head, and then on the arms.

At the time of my seeing the child, the eruption had subsided on the feet and limbs, leaving behind it an exfoliation of the epiderma. The head was covered with dandriff and scurf, while on the nates there were numerous spots of a circular figure, about the size of a sixpence, with raised margin and depressed centre, of a dull red colour, and bearing a close resemblance to the spots of lepra divested of their scales.

The child was thin and weakly, its skin muddy and rough; the conjunctivæ congested, and the eyes weeping; there was a copious discharge from the nose, a thick mucous secretion clogging the mouth and fauces, a viscous phlegm in the trachea, which impeded breathing, and a hoarse cry, which indicated swelling of the mucous membrane of the larynx; the child was, besides, very uneasy and fractious, had been suffering from a somewhat severe diarrhœa, and was still relaxed in its bowels; at the angles of the eyes, nose, and mouth, the mucous membrane and skin was excoriated, and poured out an acrid secretion; and there were similar excoriations on the lips, which had produced a tender state of the nipples of the mother.

The mother was a delicate-looking woman, somewhat over thirty-five years of age. She had suffered much from anxiety and want of rest during the illness of her infant, but she had never, so far as I could ascertain, had any symptoms of venereal disease, either in the form of sores or discharge, nor had she any suspicion of the nature of the disease under which her infant was labouring.

I recommended her to put her child on a nourishing milk diet, and prescribed for it the following remedies, constitutional and local: bichloride of mercury, half a grain; tincture of cinnamon, two drachms; syrup of white poppies, four drachms; dill-water, ten drachms. A teaspoonful to be given to the child three times a day. Nitric-oxide of mercury ointment, oxide of zinc ointment, of each one ounce. Mix. To be applied to the excoriations and eruption; to the latter, with friction, several times in the day. At the end of ten days I again saw my little patient; the child had improved greatly in appearance; she was no longer fractious and irritable; the eruption was almost entirely gone; the excoriations at the angles of the mouth, nose, and eyes, and behind the ears, had healed, and the air-passages were less obstructed. I

directed the continuance of the remedies for another period of ten days, by which time the child was well.

Observations.—The chief peculiarity of this case was, the transmission of the syphilitic poison from the father to the child, through the mother, without the occurrence of symptoms of any kind, external or constitutional, to denote the presence of the disease in the latter, unless, indeed, a general appearance of delicacy of constitution and frame be a symptom of constitutional syphilis, which I am quite ready to admit may be the case.

It is painful to reflect that lactation under such circumstances becomes a powerful emunctory to the mother, and that, by means of this outlet, the poison is conveyed from herself to her infant, but such is the case. The mother of this child doubtless owed her own safety from an outbreak of constitutional disease chiefly to the action of this emunctory, and partly to her removal from London to the seaside, and her temporary separation from her husband.

The power of morbid secretions to occasion excoriation of the skin needs no illustration, as it is evinced in medical practice in a hundred ways. In the present case the diseased secretions from the mucous membrane of the infant, flowing outwards upon the skin, caused the excoriations at the angles of the eyes, nose, and mouth, as I have frequently seen them produce a similar effect around the anus, in the groins, and in the neighbourhood of the genitals. The same morbid secretion occasioned excoriation of the nipples of the mother.

Hence, then, we have passing before our eyes, the phenomena of generation of an irritant poison, by a vital-chemical action taking place in morbid fluids; and we are enabled thereby to form an idea of the mode in which the syphilitic poison may be engendered by connexion between persons of unhealthy constitution, independently of extraneous origin.—*Lancet, Feb.* 23, 1850, *p.* 237.

167.—ON THE NATURE AND STRUCTURE OF NÆVI MATERNI, &c.

By Holmes Coote, Esq., Demonstrator of Anatomy at St. Bartholomew's Hospital.

The definition of nævi, given by Lassus, and quoted by Mr. S. Cooper, is graphic and correct—namely, that "they are an organic malformation of the skin, the natural texture of which does not exist, but a plexus of vessels is substituted for it, not endued with the natural sensibility of the cutis itself." But the inference drawn from this definition, that "they generally continue stationary during life, and may be regarded rather as deformity than as disease," is incorrect in the extreme, and is only explicable upon the supposition that the pigment stains are referred to in the latter sentence. There is scarcely any exception to the rule that a true vascular nævus, once formed, will grow, with different degrees of rapidity and at irregular intervals, as far as we know, indefinitely. It seems to act like a contagious disorder,

spreading amongst the vessels in its immediate neighbourhood; consequently, the larger its circumference, the quicker, *cæteris paribus*, is its increase, and the more widely spread the tendency in vessels apparently healthy to take on the same morbid action.

Mr. Cooper observes that the nævi familiar to us as vascular cutaneous or subcutaneous swellings, occurring usually in those parts of the body where the circulation is most active—namely, the skin of the face and head, the chest, or upper extremities—"are either of the same nature as the disease well known by the name of aneurism by anastomosis, or bear a considerable resemblance to it." Now, under the name of aneurism by anastomosis, Mr. John Bell described a species of aneurism resembling some of the bloody tumours which appear in new-born children,—a disease originating from some accidental cause, marked by a *perpetual throbbing*, growing slowly but uncontrollably, and rather irritated than checked by compression. To how many has it happened to witness in young children, patients of this hospital, pulsating nævi connected with the ramifications of arteries? I cannot recall to mind a single case, and am consequently at a loss to appreciate the statement of the late Mr. Liston, that "some of the large nævi in children pulsate synchronous with the heart's action." A pulsating tumour, however, occurs, as Mr. J. Bell remarked, in adults, and in those situations where the circulation is most active, such as the integuments of the head or face, and more particularly the lip.

As aneurisms by anastomosis are very uncommon, I will briefly state the particulars of a case which I had the opportunity of seeing and examining three years ago. A gentleman, about forty years of age, consulted Mr. Lawrence for a pulsating tumour, occupying the right half of the lower lip. He stated that it was congenital, and had increased slowly up to the present time. Some time ago the right facial artery had been tied by another surgeon, and during the operation profuse hemorrhage took place from a vessel towards the side of the tumour. No perceptible diminution in the swelling ensued,—a result which will not surprise any accustomed to view, in an injected subject, the free anastomosis of the coronary arteries of the right and left side of the face. Mr. Lawrence extirpated the whole pulsatory mass with the knife, Jan. 11th, 1847. There ensued very little more hemorrhage than would have taken place after extirpating a cancer of the lip. The ends of the coronary arteries and of one smaller vessel were tied, and the patient recovered without an unfavourable symptom. Mr. Lawrence kindly gave me the tumour to examine, and I injected it with mercury. It was composed of arteries, in the natural state of the diameter of a large pin, dilated for about an inch of their course into great sinuses or canals, the cavity of which equalled that of the radial artery in the adult. They freely communicated one with another, and were lodged in the natural structure of the lip, to which they were attached by loose areolar tissue. Upon the divided surface there were the cut orifices of eight arteries, some of them of considerable size. The walls of these dilated arteries were thin, but I failed in detecting anything remarkable by microscopical examination. Here, then, is an instance of aneurism by anastomosis. It is a pulsating swelling connected with a few arteries

of some considerable size. It is obvious that there exists a wide difference between this disease and the nævus of infants, as commonly seen, which consists in a pulseless red vascular spot, seated in or under the integument, and composed of dilatations of the capillaries which constitute the skin.

Therefore *aneurism by anastomosis* consists in a dilatation of several arteries for a certain part of their course.

Nævus maternus is composed of a congeries of capillaries.

The two diseases are essentially distinct, and require different modes of treatment.

There remains a third variety of vascular tumour, of which there have been of late in the hospital some good examples. The first case of this kind which fell under my observation was in the year 1845.

A delicate young man, æt. 20, an undergraduate at Oxford, consulted Mr. Lawrence for an oblong, pulseless, blue-coloured, vascular tumour, of four years' duration, situated in front of the abdomen, over the inferior ribs of the right side. It was firm, having been frequently cauterised. The blood when squeezed out by pressure, did not readily flow in again.

The patient attributed the disease to the rubbing of the braces; indeed, his attention was first directed to the part by the irritation which he experienced in walking. The whole mass, including some diseased integument, was extirpated by the knife: one small cutaneous artery only was tied, but the bleeding was inconsiderable. The tumour upon examination was found to consist of a number of tortuous and dilated vessels, which I concluded, from the thinness of their walls, the collapsed state of the cut extremities, which were healthy, the want of pulsation during life, and the general varicose appearance of the part, to be *veins*. They contained a thin watery yellowish-red fluid, which, under the microscope, was seen to contain blood-discs in small quantity, altered in shape, and jagged at their edges; granules, probably the remains of decomposed blood-discs; epithelium, and fatty matter.

The wound healed without a bad symptom, and the gentleman left town in a fortnight.

Now in a vascular tumour removed recently in the hospital by Mr. Lawrence, which closely resembled, in its general characters, the vascular swelling just described, I was interested in observing several of those hard concretions known by the name of phlebolithes. Phlebolithes, or vein-stones, are confined to the venous system, and their presence in such a tumour may be taken as very conclusive evidence as to the character of the vessels affected. It is the opinion of the best pathologists that vein-stones form in consequence of a limited sub-inflammatory process, which determines a coagulation of the blood in distinct layers; the coagula, for the most part spherical in shape, continued for a length of time subject to an interchange of action and reaction with the passing current of venous blood, and there is deposited in them phosphate of lime and magnesia, until the whole clot is transformed into an earthy mass. They form, then, originally, not external to, but within the vein. I believe that the same phenomenon has never been observed in the arterial system.

It has been remarked of these venous tumours, that although they have a tendency, in common with other similar degenerations affecting the vascular system, to indefinite increase, they manifest an occasional disposition to invest themselves in a capsule of the areolar membrane with which they are surrounded: their further growth then becomes limited, and they may remain stationary for many years; but we have no fair grounds for anticipating, under any circumstances, a spontaneous action determining to a permanent cure.

In connexion with these venous swellings, affecting the integument and the subjacent areolar structure, I may mention a morbid degeneration of the veins of muscles, an instance of which was witnessed a few days ago in the dissecting-room attached to this school. A large portion of the vastus externus muscle, below the broad tendon of the gluteus maximus, was converted into an irregular soft bluish-black mass; the muscular fibres, pale and wasted, being separated and pushed aside by tortuous and dilated veins. In the mass, which measured about four inches in length and two and a half in breadth, there was no increase, either in number or size, of the arterial ramifications; but the small veins, not capillaries, were enlarged to five or six times their natural diameter: the coats were thin; the tissues in which they ran loose and healthy. Let it not be thought that in bringing forward a case of varicose veins in muscle I am wandering from the subject: the affinity between the dilatations of arteries and veins, whatever may be their size, and the condition of the capillaries constituting an ordinary nævus, is considerable. In further illustration of these points I may mention a case which I saw many years ago, the particulars of which are firmly impressed upon my memory:—A little girl, the daughter of a physician, had a soft congenital swelling, with undefined edge, the size of half a walnut, over the right deltoid muscle. As it was increasing in size, it was examined by several surgeons, who concluded, from its situation, its softness, the freedom from pain, and other symptoms, that it was a fatty tumour. Its removal being thought advisable, an incision was made through the integuments of the shoulder, in the belief that there would be brought into view a lump of soft fat, surrounded by a loose capsule; but the incision was continued down to the fibres of the muscle without displaying any thing morbid, and it became obvious that the mass, whatever might be its nature, was situated deep under the deltoid muscle, in the vicinity of the shoulder-joint. Now I scarcely need remark, that, as a general rule, the deeper seated a tumour the more unfavourable is its character; and the idea immediately suggested itself, that in the present instance it might prove a medullary growth, which would involve the loss of the whole upper extremity. The deltoid muscle was divided longitudinally, when a vascular mass was discovered imbedded in its substance: the bleeding was inconsiderable, and for the most part venous; and the morbid structure was readily removed. The case terminated perfectly well, and I understand that the patient, now full-grown, has little or no scar left to commemorate the event.

If we group together the different vascular tumours to which allusion has here been made, and which include, as far as I know, all the varieties affecting the skin and subjacent soft parts, we may arrange them in the following order:—

1. Aneurisma per anastomosem, which pulsates synchronous with the heart's beat: a true aneurism of the smaller arteries, involving all their coats and their entire circumference.

2. Nævus, affecting the capillaries either of the skin (cutaneous) or of the subjacent areolar tissue (subcutaneous), the common nævus of infants, which does not pulsate.

3. The venous swelling, which does not pulsate, and which has been observed in the subjacent areolar tissue and in muscle.

I regret that it is not in my power to describe from microscopical examination the condition of the walls of the dilated vessels. It would be highly interesting to ascertain whether there was any change in the elastic coat of the vessels, which would explain the reason of their yielding to the pressure of the current of blood.

It so happens, however, that the means employed for the cure are such as to destroy the diseased parts *in situ*. It rarely happens that a surgeon willingly undertakes to remove by the knife from infants, all of whom bear the loss of blood badly, a tumour composed entirely of vessels: the mere division of the skin is followed by a flow of blood sufficiently profuse to blanch the child; and the further steps in the operation become obscure and tedious. Even in those cases in which extirpation becomes necessary at a more advanced period of life, the structures have been mostly blended, hardened, and changed from what they formerly were, by the previous application of the ligature or of caustics.

In the case of venous tumours I have observed that the tortuous and dilated vessels become ultimately adherent one to another, and that portions of the tubes, containing blood, are cut off, and isolated by such adhesions; the blood, no longer in the current of the circulation, undergoes change; the blood-discs become jagged at their border, then they resolve themselves into granules, and which, ultimately separating, float free in a serous fluid, thinner than the serum of the blood, in consequence of a secretion of water from the walls of the cysts into which these isolated portions of the veins are converted. The walls of the cysts, which retain little or no trace of their normal characters, become thinned and absorbed where adherent, so that communications are established between adjacent cysts; and when a tumour thus formed is cut open, it resembles a common cystic tumour, the cysts containing a fluid, which, though originally blood, has lost its red colour by the disintegration of the blood-discs, and has become thinner from the influence of the secretion from the cyst-wall. From such a tumour it would obviously be impossible to squeeze out, during its connexion with surrounding structures, the whole, or even any great part, of the fluid contained in its cells: blood could be expelled only from those vessels which were continuous with the surrounding healthy veins. It is possible, therefore, that some doubt might be entertained as to the nature of such a swelling, both from the characters which it presented when *in situ*, and the appearances brought to view by examination after removal.

I have purposely avoided entering upon the question of treatment, as it would lead me far beyond the proper limits of the present communication.—*Med. Gazette, March* 8, 1850, *p.* 412.

168.—OBSERVATIONS ON THE PHENOMENA OF ENDOSMOSE.

By M. Matteucci, Professor in the University of Pisa.

[The following observations are quoted from M. Matteucci's work 'On the Physical Phenomena of Living Beings,' translated by Dr. Pereira.]

Theory of Endosmose.—Dutrochet has endeavoured to give an explanation of the phenomena of endosmose, and Poisson and Becquerel have proposed others. Thus, some ascribe endosmose to the action of an electric current developed by the contact of the two different liquids;—a current which will produce the passage of the water through the membrane, from the positive to the negative pole, as in the well-known experiment of Porret. But to render this explanation probable, it would be necessary to prove that the contact of water with alcohol, solution of sugar, &c., developes electricity; which is not the case. Poisson supposed that the least dense liquid entered the capillary tubes of the membrane, and that this capillary thread, drawn down by the pure water, and up by the denser liquid, must be elevated in virtue of molecular attraction. But this explanation becomes inadmissible when we consider that alcohol, which is lighter than water, produces endosmose, and that certain calcareous and siliceous stones, placed under the same conditions as membranes and plates of clay, do not give rise to the same effect.

Up to the present time we have not any satisfactory theory of endosmose: but we know that the general conditions of the phenomenon are as follow:—

1st. That the two liquids should have an affinity for the interposed membrane.

2ndly. That the two liquids should have an affinity for each other, and be miscible.

If one of these conditions be wanting, endosmose does not take place. Experiment proves that the current of endosmose is not produced by the least dense liquid, nor by the most viscid one, nor by that which is endowed with the greatest force of ascent in capillary tubes. The current is in general determined by the liquid which has the greatest affinity for the interposed substance, and by which it is imbibed with the greatest rapidity. In fact, it is evident that the membrane imbibes the two liquids unequally; and that the one which is imbibed with the greatest facility, ought to mix with, and augment the volume of, the other.

Endosmose in living beings.—What we have here stated must be sufficient to convince you that this phenomenon is perhaps one of the most important physical facts applicable to the functions of living beings. Microscopic observation has now put beyond doubt that, in all tissues, whether vegetable or animal, and in those liquids which are produced by the alteration of organized and living beings, there are constantly found, at a certain epoch, microscopic corpuscles, which have a peculiar and characteristic form, and are called elementary or primitive cells. These bodies consist of an exceedingly delicate membrane, which has a spherical

form, encloses a liquid, and has on its inner side a small organized body, called the *nucleus* or *cyto-blast*. The cells float at first in a liquid, which Schwann has named *cyto-blastema*, and they ultimately become included in, and almost confounded with it, when this liquid acquires a greater or less density. In different tissues, the elementary cells are more or less closely approximated to each other; the *cyto-blastema* or intercellular substance being invariably the bond of union between them. The life of the elementary cells certainly plays the most essential part in the development and preservation of the tissues of living bodies; and, since these cells are found under conditions favourable to endosmose, we have no reason for refusing to admit its existence. A vesicle filled with a liquid, and placed in the midst of another liquid, may act on the outer one, receive the surrounding liquor, and reject the one it had previously contained, by operating in a manner analogous to endosmose.

Conclusions. — The novelty and importance of the results we have obtained, must be my excuse for relating them in this extended form. The general conclusions which we have deduced from them are as follows:—

1st. The membrane interposed between the two liquids is very actively concerned, according to its nature, in the intensity and direction of the endosmotic current.

2ndly. There is, in general, for each membrane, a certain position in which endosmose is most intense; and the cases are very rare in which, with fresh membrane, endosmose takes place equally, whatever be the relative position of the membrane to the two liquids.

3rdly. The direction which is most favourable to endosmose through skins, is usually from the internal to the external surface, with the exception of the skin of the frog, in which endosmose, in the single case of water and alcohol, is promoted from the external to the internal surface.

4thly. The direction favourable to endosmose through stomachs and urinary bladders varies, with different liquids, much more than that through skins.

5thly. The phenomenon of endosmose is intimately connected with the physiological condition of the membranes.

6thly. With membranes, dried or altered by putrefaction, either we do not observe the usual difference arising from the position of their surfaces, or endosmose no longer takes place.

Endosmose of cells. –A cell is the elementary organ of all animal and vegetable tissues, and cell-life involves an act of endosmose: this shows how much the phenomenon of endosmose requires to be more completely studied, in order that we may be enabled to make of it all the applications of which it is susceptible.

Endosmotic action of purgatives.—I cannot conclude this lecture without referring to the recent experiments of Poiseuille, made with the view of explaining by endosmose the purgative action of certain substances. He found that there was endosmose through animal tissues, from the serum of the blood to Seidlitz water, and to solutions of sulphate of soda

and common salt. Now this is precisely what happens when we use these medicines internally; the rejected excrements contain an abundant quantity of albumen. In this case we must admit, that endosmose takes place through the capillary vessels of the intestine, from the serum of the blood to the saline solution introduced into the alimentary canal.

These physical phenomena, which, although they do not explain all the peculiarities of the digestion of fatty substances, nevertheless contribute to render them less obscure. The chyliferous vessels, which terminate in closed or blind extremities *(en cul-de-sac)*, and are enveloped by intestinal mucus, are, especially in a fasting animal, filled with an alkaline liquid, very analogous to lymph. After digestion, particularly when the animal has been fed on fatty substances, the liquid of the chyliferous vessels differs from what it was previously, merely by the addition of fatty corpuscles, which give it the milky appearance. It is natural to suppose, that this chemical affinity, which produces the milky liquid in the mixture of the alkaline solution and oil, is also exerted through the membrane of the chyliferous vessels, which certainly imbibes as much of the alkaline solution as of the milky liquid, formed by the action of the alkali on the fatty bodies.

The phenomena of endosmose, of which I have spoken, may also be admitted, with great probability, as one of the causes which produce absorption by the chyliferous vessels. It is certain, that absorption could not take place, if the inner sides of the intestines were not bathed with some liquid, for which the fatty bodies had some affinity.

It is easy to demonstrate, by experiments, that the alkaline condition of the intestinal coats favours this absorption. Fill two funnels with sand, equally shaken down in each. Pour into one pure water, into the other an alkaline solution; when the liquids have filtered through, pour an equal quantity of oil on each filter. For several hours, the oil will remain upon the surface of the sand, which has been moistened with pure water; whilst in the other funnel, in which the sand has been moistened with the alkaline solution, the oil will rapidly disappear by imbibition.

The neutral azotised substances which pass into the blood, after having been dissolved by the gastric juice, would rapidly destroy the neutral or slightly alkaline condition necessary to the preservation of the qualities of the blood; but the alkali of the chyle, of the lymph, of the bile, and of the pancreatic fluid, preserve the neutrality of it.

Origin of cells. —The chyle and the lymph hold in suspension a great number of small grains, which are from 1 to 2 thousandths of a line in diameter, and which appear to be formed of a fatty substance enveloped in a membrane, which is supposed to consist of a substance analogous to proteine. These same granulations exist in yolk of egg, in the milk, chyle, lymph, and in all the liquids exuded in pathological cases, or destined for new formations. These elementary granulations have been seen to unite and form a globule, a cell analogous to blood-cells; hence, they have been regarded as the morphological elements of all animal tissues.

Recently, Donné observed, by injecting milk into the blood-vessels, that the globules of milk disappeared, after some time, by becoming

covered with an albuminous layer like a bladder; that they then become reduced to the condition of white globules of the blood, which, finally, also disappeared, being probably transformed into red globules. Afterwards, all the blood re-acquired the appearance which it had before the milk had been injected into it.

The organic element seems then to be reduced to a vesicle consisting of a layer of albumen collected together and organized around a *nucleus* formed principally of a fatty substance.

I can bear testimony to an important experiment made by Ascherson: it consists in putting a fatty liquid in contact with albumen. This latter instantly coagulates, as you here see. If you mix them together, and put a drop of the mixture under the microscope, you will perceive a group of vesicles, each formed of a granule of oil, enveloped by an albuminous membrane, in some degree coagulated, and, it appears, like what the real adipose cells would do, on the stage of the microscope. We can see this still better, by putting on a plate of glass, a drop of oil, and one of albumen, and slowly bringing them in contact: it is curious to observe, by the microscope, the almost instantaneous formation of a very delicate and elastic membrane, which soon acquires numerous folds. Ascherson has proved that this formation, produced by albumen and oil, is really of a cellular nature. By adding a little water to a drop of this formation, he saw the cells swell up, and at the same time some small drops of oil escaped. By using diluted acetic acid instead of water, the cellules appeared to him to become so voluminous, that they burst. In oil, on the contrary, they became compressed and diminished in size.

Evidently these facts, which nevertheless require to be varied and extended, belong to the phenomenon of endosmose, and cannot be comprehended without admitting the cellular formation. Here, then, is a physico-chemical operation, which may lead to the discovery of the formation of elementary granulations. Fatty substances, and combinations of proteine, are constantly introduced into the organism; they are met with in all animal tissues; the globules of fat, which pass into the chyliferous tubes, and are there found in an albuminous liquid, must soon become enveloped by analogous membranes; and ought, for this reason, to form vesicles resembling those which microscopic observation discovers in the chyle, the lymph, and the blood.—*Edin. Med. and Surg. Journal, Jan.* 1850, *p.* 194.

169.—*On the Use of Acetic Acid in Preventing the Spread of Scarlatina.* By Dr. J. Webster, Consulting Physician to the St. George's and St. James's Dispensary.—[Dr. Webster recommends frequent sponging of patients affected with scarlatina, with tepid vinegar and water, especially in the early stages, when the skin is hot or the pulse accelerated. He states that he has great confidence in the efficacy of this means, in preventing the spread of the disease; and gives several cases in illustration of this.]—*London Journal, Dec.* 1849, *p.* 1295.

170.—ON SEMOLA, OR A NEW PREPARATION OF WHEAT GLUTEN; AND ON VARIOUS OTHER ARTICLES OF DIET.

By Lloyd Bullock, Esq.

[After speaking of the desirableness of obtaining articles of diet by which the physician may be enabled to introduce, at will, either "respiratory principles", to maintain animal heat, and satisfy the cravings of the appetite, without supplying nourishment properly so-called; or articles which are on the other hand, simply "nutritive", Mr. Bullock observes:]

In the special cases of diabetes, it has long been recognised as a desideratum to find some vegetable substances congenial to the stomach, and at the same time highly nutritious, with as little starch as possible. In many forms of indigestion and diseases of debility, it must be equally desirable to administer a diet of a similar character—namely, as nutritive as animal food, without stimulating. There is no substance in nature which seems to possess the required chemical composition and properties so perfectly as wheat gluten, and the facility with which this is separated from the starch, sugar, &c., of the wheat, has directed much attention to it. But all attempts hitherto made to convert gluten into a palatable and manageable food have failed.

I have myself prepared the gluten bread for the profession to a considerable amount, and I find it impossible to produce an eatable, not to say palatable bread, without the addition of a considerable proportion of flour. The cost of this bread, too, is necessarily very great, totally precluding its general adoption, even in the comparatively rare case of diabetes, and it is so disagreeable to eat that it has scarcely been tried in other diseases.

Dr. Percy has recently recommended the mixing of fine pollard, or ground bran, or the woody fibre of the potato, with the gluten. These substances may serve to modify, to some extent, the tough texture of the gluten, but they certainly do not make gluten bread more agreeable or more digestible.

These remarks may serve to explain my reasons for now requesting the attention of the profession to a new article of diet, under the title of Semola. A highly respectable mercantile firm having requested me to examine a substance which they propose to sell under that title, I find that it contains between fifty and sixty per cent. of wheat gluten, and to consist of this, together with pure wheat starch, in a physical condition which renders it admirably adapted to become a general article of diet. Having been made acquainted with the process adopted in its preparation, I was enabled to suggest certain modifications, by means of which an article, uniform in composition, agreeable to the taste, and well adapted for a variety of culinary purposes, may be manufactured.

It must surely be a matter of great importance, to possess a substance containing so large a proportion of the staminal principle of nutrition in a form agreeable to the stomach and pleasant to the taste, to recommend in cases of debility whether local or general.

Perhaps it would be unbecoming in me to dwell upon the special application of a substance of this character, as the profession will perceive at once how well adapted it is to be made the food of children, as

supplying flesh and blood as freely without stimulating like animal food; and how numerous are the occasions when it is desirable to furnish to persons of weak digestion a bland and highly nutritive diet?

Let it be observed that the practitioner is not called upon to recommend an empirical food, like those sold under the name "farinaceous", "infant's food," &c., which are merely mixtures of the flour of the cheaper grains, oats, barley, &c., with raw or baked wheat flour.

The composition of Semola, as I have observed, is uniform, and its physical form renders it highly agreeable when cooked as water-gruel, milk-gruel, or made into boiled or baked puddings, added to soups, or in any other way. In all cases it is much relished. In conclusion, I cannot but think that the chemical composition and properties of Semola must render it a very valuable adjunct to remedies, and recommend it to the general adoption of the profession. Whether the small amount of starch it contains, beyond that necessarily added to gluten bread, will preclude its use in diabetes, remains, I conceive, to be determined experimentally. There is no other case, so far as I know, where any attempt to supply food altogether without starch is desirable—and diabetes is happily rare—most assuredly that object has not hitherto been, nor is it likely to be very soon effected, but I would suggest that most of the saccharine matter of the wheat flour being washed away in the preparation of the gluten, may render the presence of simple starch less objectionable.

[In a second paper upon the subject, Mr. Bullock observes:]

I have assumed that the distinction between the nitrogenous and non-nitrogenous principles of food was pretty generally recognised. To a certain extent this was somewhat premature: not only do many persons still refuse to recognise this distinction, but in some medical works published very recently, we find arrow-root and other substances, consisting principally of starch, recommended to be given in debility, and represented as highly nutritious. Now it should be remembered, that the different functions in the animal economy, fulfilled by these two classes of principles respectively, are established, not only on the analysis of food, and the substances derived therefrom in the body, which, by a safe process of reasoning, are assumed to be necessarily connected; but experiments have shown, that animals supplied only with starch or sugar will emaciate and die of starvation, whilst upon gluten they thrive and retain their health. Magendie's experiments upon dogs, taken in connexion with the investigations of chemists, have determined the doctrine in question, if anything in science can be brought to a final determination. I would therefore suggest the expediency of adhering in future to an uniform phraseology in speaking of diet; for although, in certain febrile conditions of the system, amylaceous food is necessary, it must follow that in non-febrile debility, easily assimilated nitrogenous principles are those whence alone invigoration can be expected. I think, however, it will be found, that there is a considerable difference in the influence exerted on the constitution by the nitrogenous constituents of vegetables, and animal fibre, albumen, and caseine. Wheat gluten, as it exists in the semola, is cer-

tainly less stimulating, whilst it is as nutritious as animal food. Several of my professional friends have given it to infants, children, and invalids, and their reports are uniform as to its being agreeable to the taste and stomach, not rejected by infants, like oat or barley gruel, &c. Indeed, in several instances where substituted for all other diet, it has proved remarkably efficient in weakly children, reviving and invigorating them in a most striking manner. When boiled in milk it leaves nothing to be desired in the way of food for infants, children, and invalids. Semola milk gruel is very agreeable as well as highly nutritious, and the combination may be especially recommended, for other reasons, as will appear from what follows.

Another matter relative to diet, which the physiologist owes to chemistry, whilst it is perhaps too little regarded in prescribing for diseases, is the necessity for the maintenance of the due association of inorganic matters with the organic constituents of food. Dr. Bence Jones has, indeed, in his lectures, well stated, in a general way, this important consideration; but there are one or two practical suggestions I would append to his excellent remarks. In sifting wheaten flour, and the separation of the cuticle, other matters are left and rejected beside the insoluble woody fibre, which unless supplied from other sources, may be needed for the purposes of the living economy. A well-known tract, by a physician, dwells much on the propriety of including the entire wheat in food, and recommends bread always to be made of wheat-meal. This excellent recommendation will be but partially adopted, the habits of society being rather in favour of refinements of food than otherwise. In fact, most of the bread sold as meal-bread, is simply made of ordinary flour, to which some pollard has been added, to give the appearance of whole meal-bread. Thus the purpose of the author of the tract is defeated.

But there is another way to accomplish it, when it may be found desirable, in regulating the diet of a patient, to give all the constituents of wheat, merely to let him eat it simply boiled as a vegetable.

Boiled wheat, eaten with hot meat, gravy, or butter sauce, is not only one of the most agreeable, but it is by far the most nutritious of all culinary vegetables. It requires to be boiled for nearly two hours, or to be steeped for ten or twelve before boiling, when about half an hour will be sufficient. It is really extraordinary that this wholesome and nourishing grain is not oftener used in the place of the potato in this way. At any rate, when the physician recognises the propriety of adding to food the entire constituents of the wheat, organic and inorganic, he may prescribe it in this way; and there is another incidental effect which may have some influence—namely, that it generally obviates constipation.

The question of the connexion of inorganic matters with the processes of digestion and assimilation, and consequently of diet, has, however, a wider range. Dr. Garrod has thrown out the suggestion that sea-scurvy may probably depend upon the absence of potassa from the food of mariners, and that it is the presence of this element in green vegetables and acescent fruits which render them such effectual preventives or remedies for that disease. Now Liebig has shown, in his late work on Food, that in the process of salting meat, not only potassa but alkaline

and earthy phosphates, and other substances, are extracted, and he observes, "a change in the gastric juice, and consequently of the products of the digestive process, must be regarded as an inevitable result of a long-continued use of salted meat; and if, during digestion, the substances necessary to the transformation of that species of food be taken from other parts of the organism, those parts must lose their normal condition". Chevreul has shown that when beef is boiled in water, the inorganic substances amount to a fourth part of the weight of the matters dissolved in the soup; and Liebig has proved that these consist principally of phosphates of potassa, lime, and magnesia, and chloride of potassium.

The first practical suggestion I would make, in reference to this subject, is the propriety of adding the salts withdrawn from meat, in the process of salting, to the *biscuits* which form the staple of sea diet. If the due proportion in the quantities of the several saline substances were carefully maintained, they would certainly render sea-biscuit a far more valuable adjunct to the salted meat; in fact, they would supply exactly the inorganic constituents which the salt had withdrawn from the meat in the process necessary for its preservation. Biscuits, with this addition, would doubtless be more wholesome, and would, in long voyages, especially those undertaken into high latitudes, where fresh meat or vegetables are for a long period unattainable, most probably be an efficient means of preventing scurvy and maintaining the health of the crew.

In another part of his work, Liebig has mentioned chloride of potassium as being a very agreeable condiment, as well as a most convenient form for the introduction of potassa into the system. I would suggest to practitioners, whether it may not often happen that the medicines they prescribe, and find efficient, become so, by adding an element to the food of the patient, unwittingly excluded from his course of diet? I see no reason, indeed, why a compound condiment, composed of a due mixture of chloride of sodium, chloride of potassium, and the phosphates, should not often be recommended in the place of common table-salt, which, according to the present improved methods of manufacture, is almost pure chloride of sodium—at any rate it does not contain the admixture of other saline materials which formerly adhered to it.

Again, Liebig, in the work already alluded to, has inserted the following recipe for, and remarks on, the preparation of soup:—

"The characters of flesh at once suggest the best method of preparing, in the short space of a few minutes, the strongest and most highly-flavoured soup; and any one may convince himself, by the simplest experiments, of the truth of the assertion made by Proust, that those constituents of soup, on which its taste and other properties depend, exist ready formed in the flesh, and are not in any way products of the operation of boiling.

"When one pound of lean beef, free of fat, and separated from the bones, in the finely-chopped state in which it is used for beef-sausages or mince-meat, is uniformly mixed with its own weight of cold water, slowly heated to boiling, and the liquid, after boiling briskly for a minute or two, is strained through a towel from the coagulated albumen and the fibrine, now become hard and horny, we obtain an equal weight of the

most aromatic soup, of such strength as cannot be obtained even by boiling for hours from a piece of flesh. When mixed with salt and the other usual additions by which soup is usually seasoned, and tinged somewhat darker by means of roasted onions or burnt sugar, it forms the very best soup which can be prepared from one pound of flesh.

"The influence which the brown colour of this soup, or colour in general, exercises on the taste, in consequence of the ideas associated with colour in the mind, (idea of strength, concentration, &c.,) may be rendered quite evident by the following experiment. The soup coloured brown, by means of caramel, is declared by all persons to have a much stronger taste than the same soup, when not coloured; and yet the caramel, in point of fact, does not in any way actually heighten the taste.

"If we allow the flesh to boil for a long time with the water, or if we boil down the soup, it acquires, spontaneously, when concentrated to a certain point, a brownish colour and a delicate flavour of roasted meat. If we evaporate it to dryness in the water-bath, or if possible, at a still lower temperature, we obtain a dark brown, soft mass, of which half an ounce suffices to convert one pound of water, with the addition of a little salt, into a strong well-flavoured soup.

"The tablets of so-called portable soup, prepared in England and France are not to be compared to the extract of flesh just mentioned; for these are not made from flesh, but consist of gelatine, more or less pure, only distinguished from bone gelatine by its higher price.

"From thirty-two pounds of lean beef, free from bones and fat (eight pounds dry meat and twenty-four pounds water), there is obtained one pound of true extract of flesh, which, from its necessarily high price, can hardly become an article of commerce; but if the experience of military surgeons agree with that of Parmentier, according to whom 'the dried extract of flesh, as an article of provision in the train of a body of troops, supplies to severely-wounded soldiers a restorative or roborant, which, with a little wine, immediately revives their strength, exhausted by great loss of blood, and enables them to bear the transport to the nearest hospital,' it appears to me to be a matter of conscience to recommend to the attention of government the proposal of Parmentier and of Proust.

"Now that the composition of the extract of flesh is somewhat more accurately known, it ought to be easy to distinguish the genuine from the false. Of the true extract nearly eighty per cent is soluble in alcohol of eighty-five per cent, whilst the ordinary tablets of portable soup rarely yield to that menstruum more than four or five per cent.

"I consider this extract of flesh as not less valuable for the provisioning of ships and fortresses, in order to preserve the health of the crew or garrison, in those cases where fresh meat and vegetables are wanting, and the people are supported by salt meat."

Now, so far as the extraction of the inorganic matters, and of organic substances not coagulable by heat are concerned, this process of Liebig is perfect; but it is very remarkable that all chemists who have recommended various methods of preparing soups from animal substances should have overlooked one most striking fact—namely, that by this and other similar processes they separate and reject one of the most valuable

principles of nourishment—namely, the albumen. In pursuing some experiments on this subject, I have found that not only may this albumen be advantageously retained, but that when retained with the other soluble ingredients, it forms an article of diet, which, so far as its amount of nutritive matter is concerned, far surpasses any form of soup or broth whatever. However, when the inorganic constituents of meat, its flavour, and juices soluble in boiling water with some gelatine, are required, Liebig's plan of making soup is very simple and efficient. And this may be all that is desirable when given as a very light repast, or when intended to precede, in the usual way in which fashion has prescribed, a full meal of solid viands; for once fashion is right, such a light animalized fluid forms an addition to the gastric juice, and assists its office in the process of digestion.

But if it be ever desirable to possess all the soluble nourishment of fresh meat, to be able to give, in a concentrated form, the essence of meat, it is necessary to proceed in its preparation in quite a different manner. Indeed, it appears to me, that it must be often very advantageous to possess nutritive matter in a fluid form, free from insoluble fibrine, so constituted as to contain a large amount of nourishment in a small bulk. This, I conceive, can be accomplished in the following manner: take a pound of meat, carefully separated from fat, chop it as fine as possible, (like mince-meat), pour upon it eight ounces of cold or lukewarm water, (the temperature *must not exceed* 100 F.), and mix it well; let it stand an hour, stirring it three or four times; press out the fluid, which will amount to about six ounces; upon the meat pour again another eight ounces of cold or lukewarm water, and mix well as before; let it stand half an hour, occasionally stirring; press again, and the fluid will this time be eight ounces; then place the apparently dry meat, broken up, in a small tin vessel, and set it in a water-bath containing cold water, heat the water of the water-bath gradually to the boiling point, and keep it boiling about twenty minutes. About six ounces of fluid will by this means exude from the meat. Mix the three fluids so obtained together; add salt, spices, or other flavouring materials, and boil for about twenty minutes in a covered vessel. The result is a thick fluid of a very peculiar appearance, from the coagulation of the albumen, which is extracted by cold water. But this albumen, from its being in small flakes or granules, must be easily digestible, and it represents a large amount of nourishment which is lost in every method of making soup, and, indeed, always where soup is boiled and strained. Still further to enhance its nutritive power, and to thicken it, the addition of about one ounce of the semola above described may be recommended.

It appears to me highly desirable at all times to distinguish this preparation of meat from soups or broths; it has a peculiar physical appearance, and the profession will at once perceive its special applicability to cases where a large amount of nourishment is desired to be given in a small compass, in a fluid form, conditions certainly wanting in the usual way of preparing liquid animal food. On these considerations would it not be well to give it a distinct designation? I venture to propose for it the name of *trophazome*, and we might then speak of beef trophazome, chicken trophazome, &c.—*Lancet, Dec.* 15, 1849, *p.* 627; *and March* 9, 1850, *p.* 295.

171.—*On the Efficacy of Lupulin in Preventing Chordee, &c.* By Dr. Page.—More than two years since, I introduced lupulin to a limited extent into the Philadelphia hospital as a remedy to prevent nocturnal erections in different forms of acute venereal disease; and have subsequently used it sufficiently often in my practice, to justify its presentation to the profession as a very good article for the purpose, one of great efficacy, and entirely free from many of the objections to the preparations of camphor, opium, dulcamara, stramonium, &c., which have hitherto been relied on. One of the most painful and troublesome attendants upon gonorrhœa is chordee, brought on by nocturnal erections, the occurrence of which has been completely prevented by the administration of lupulin at bedtime. In acute gonorrhœa it not only prevents erections, and consequently chordee, at night, but it also seems to exercise a very soothing effect on the inflamed urethra, and to facilitate the operation of medicines to cure the disease. Relief from the troublesome pain in the perineum, in chronic gonorrhœa, and during the treatment of stricture with the bougie, has been obtained by the administration of lupulin alone. In the treatment of chancres on the penis, the process of healing is often interfered with, and the efforts of nature and of the surgeon placed somewhat at defiance by the occurrence of erections which distend the parts and lacerate the edges of a weak but imperfectly-formed cicatrix. In this disease lupulin has been used with the desired effect. The lupulin has been administered for nocturnal seminal emissions, and although it does not claim a curative power in this disastrous affection, it will prevent their occurrence so long as the patient is freely under its influence, and will give the practitioner an opportunity to prosecute any treatment which he may adopt, with an increased prospect of success, from the interruption to the habit of the disease, and from the prevention of erections when topical applications are made to the urethra.

Other practitioners have confirmed the opinions expressed above, and Dr. Hartshorne furnishes an example in which the venereal appetite was completely suppressed in a case of onanism by the administration of two-grain doses several times in the twenty-four hours. The ordinary dose is from five to ten grains, in the form of powder or pill, given at night, and repeated if required. It does not give rise to headache, constipation, or other unpleasant consequence. ('Philadelphia Med. Exam.')—*Brit. and For. Medico-Chirurg. Review, Jan.* 1850, *p.* 276.

172.—*On the Employment of Baths containing Oil of Turpentine.* By Dr. T. Smith, Cheltenham.—[Dr. Smith recommends the employment of alkaline camphine or turpentine baths, in chronic rheumatism, lumbago, sciatica, gout, and other affections. He says,]

I have employed camphine in the form of a bath, mixed with common soda; or two pounds of the latter with from a quarter of a pint to half a pint of camphine, and half an ounce of oil of rosemary, will form an excellent bath. In delicate skinned patients, females and children, ℥ii of camphine will be sufficient. I may remark, *in limine*, that the alka-

line camphine bath possesses virtues peculiarly its own. In the coldest day in winter, as I have verified in more than one instance, it may be employed with the most perfect safety. Whilst the individual is in the bath, he experiences, to my knowledge, no disagreeable annoyance from the disengaged vapour; on the contrary, if we except the taste of the turpentine, which for some time remains in the mouth, a sense of calmness and tranquillity very often follows a previously disturbed, irregular, or excited condition of the respiratory or sanguiferous systems. After five minutes recumbency in the bath, the pulse is found to become fuller, softer, and slower; I have seen it fall from 100 to 80. The respiration also becomes freer, deeper, and less laboured. On coming out of the bath, the whole skin has a peculiar velvety, soft, and agreeable feeling; the breath is strongly tainted with the terebinthinaceous odour. If it have not been too hot, a pleasurable tingling warmth is experienced throughout the whole cutaneous surface; and this, with the preceding symptoms, may continue twenty-four hours. One great advantage of this bath will be found in the circumstance, that it may be employed at a heat from 10 to 15 degrees below the temperature of the ordinary warm one, without including that sensation of chill to which some delicate constitutions are so peculiarly obnoxious; ten or fifteen minutes is the length of time a patient ought to remain in a bath of this description. In the first instance, it is well for patients to commence with a smaller quantity of the turpentine and soda, say a pound of the latter with two or three ounces of the former, and gradually increase its strength on each repetition of the bath, to the first mentioned proportions. This bath may be taken every second or third day, according to the urgency of the symptoms and the nature of the affection for which it is prescribed.—*London Journal, April* 1850, *p.* 329.

173.—*On a probable Danger from the Use of Cod-liver Oil.* By Dr. Benson.—At a recent meeting of the Surgical Society of Ireland, Dr. Benson made the following statement regarding cod-liver oil:—

It was not to be expected that a remedy of so much power could be used with impunity in all cases. Having such efficacy in checking emaciation, in restoring the wasted flesh, and bringing back colour to the faded cheek, it might be anticipated that it would in some cases of phthisis occasion a congested condition of the lung, and even give a tendency or prove a predisposing cause to pneumonia; and this was, in fact, what he thought he had observed in some instances, and it was to this he begged to call the attention of the meeting.

It so happened that in almost every patient who died of phthisis under his care while using cod-liver oil, he found the lung congested and consolidated, not only in the neighbourhood of the tubercles, but through nearly the entire of both lungs. This morbid condition, it is true, is often met with where no oil has been used, but he was struck with the greater frequency of it in the post-mortems he had made where the oil was freely administered. ('Dublin Med. Press.')—*Med. Gazette, Feb.* 1, 1850, *p.* 216.

174.—*Golden Flax Lint.*—The following is the description which the manufacturers give of this peculiar lint:—

"This unrivalled article is made directly from the flax, and is guaranteed to be pure linen, free from either cotton or woollen, requires no washing in chloride of lime, nor in any other irritating fluid, and may be had in pieces of any length- as 50 to 100 yards. It is uniform in thickness, grass-bleached, strong and light, cooling and healing to wounds, and free from dirt and every irritating substance. One pound of this lint contains a considerably larger surface than a pound of the common old rag lint, and is not dearer in price."

(We have examined a specimen of this lint with much care, and we regard it as a very excellent and pure article, and one that is admirably calculated to accomplish the purposes for which it is designed. ED. 'Lancet.')—*Lancet, March* 2, 1850, *p.*267.

175.—*On "Ingrowing" of the Toe-Nail.* By H. J. M'DOUGAL, Esq.—[Mr. M'Dougal relates the following case: a gentleman was brought to him with an affection of the great toe which rendered him quite unable to walk, from the pain which pressure of the foot upon the ground occasioned. Mr. M'D. says,]

On examination, the toe was found slightly swollen, and with a reddish, erythematous blush extending up the foot. There was a very little fungoid granulation by the side of the nail, touching which was by no means so painful as pressure either on the under part of the toe, or on the upper and inner surface of the nail. The edge of the nail was quite invisible.

I directly proposed the usual operation of division of the nail in the centre, and eversion of the affected side. This had been proposed by two surgeons, whom the patient had previously visited, and was decidedly objected to. Being left to my own resources, therefore, I proceeded to scrape away, with an angle of glass, the inner surface of the nail (holding aside the flesh with the left hand) until its structure had become so thin that, with a pair of scissors, I was easily enabled to divide it for a short distance, and with forceps to lift out the piece in the corner. This gave little or no relief, and I was induced to seek further for the cause of the pain and distress felt on touching the toe. A horny-looking surface filled the space from which the piece of nail had been removed; and, on scraping round this with the point of the scissors, I succeeded in turning out a hardened mass of collected epithelium scales, nearly as large as the seed of a sweet pea. The surface underneath was red, and secreted a sanious matter. Perfect relief ensued on the removal of this extraneous matter, and the patient congratulated himself on his own obstinacy in not consenting to the very painful operation of losing half his nail. A morsel of dry lint completed his cure in twenty-four hours, and a little occasional attention to the part has since saved him from further suffering.

I am not aware that the condition I have described above has been noticed by any surgical writer in our language, with the exception of

Mr. Colles, of Dublin, who refers to it as only occurring on one side of the nail. I can quite conceive, however, that with a little attention many persons might be saved the exquisitely painful and barbarous operation now so often used, of tearing asunder the inflamed matrix, confessedly one of the most tender parts in the whole structure of man.—*Med. Times, March* 16, 1850, *p.* 195.

176.—*New Adhesive Dressing.* By Dr. MELLEZ.—From his dissatisfaction with the ordinary adhesive dressings, Dr. Mellez was led to adopt a solution of "gum lac," which is much used in the arts as a varnish and adhesive.

He uses a solution of this substance in spirit of wine, made with the aid of a moderate heat, and in such proportion as to give a mixture having the consistence of jelly, or nearly approaching to it. It can be made in a common wide-mouthed bottle, and a simple cork suffices for its preservation. When he uses it, he spreads it with a spatula upon pieces of cloth or taffetas, cut to the size required. According to him, it possesses all the good properties of collodion, and even in a higher degree than that substance—viz., contraction during its desiccation, impermeability to air, absence of all irritating action on the skin or wound, intimate adherence to the skin, and resistance to the action of water, fatty matters, or the discharges from the wound. It has not like collodion, the quality of being colourless; but he believes that it might, if required, be decolorized, and, if applied upon animal membrane, would furnish a transparent dressing. It does not dry so quickly as collodion, but that is the only advantage the latter possesses. The lac dressing, however, does not require so long time as to be inconvenient to the surgeon. Moreover, it is not indispensable for the lac, as it is for the collodion, that the skin be absolutely dry. It has, further, the advantage (not to be overlooked) of being more moderate in cost. ('Bulletin de Thérapeutique.')—*Monthly Journal, June* 1850, *p.* 575.

177.—*On a New Preparation for Stopping Teeth.* By J. T. DAVENPORT, Esq., Bloomsbury.—[Mr. Davenport gives the following recipe:]

Pour a small quantity of collodion on a plate or glazed surface; allow it to evaporate till it acquires the consistence of a thick paste, or, in more familiar language, a pill consistence; let the cavity of the tooth be well dried, and quickly filled with the paste; in the course of a few minutes it will be hard and fit for mastication. Very slight pressure is required, and, being of a vegetable nature, somewhat analogous to the tooth itself, will resist the action of vegetable juices, and remain colourless.

[Mr. Davenport prepares his collodion in a manner different from that usually adopted. He tells us:]

My recipe differs from the usual process in three respects—viz., an increased proportion of sulphuric acid; a longer period for maceration; and an additional quantity of absolute alcohol. By the first and second

alterations I obtain a more perfectly soluble cotton; by the latter the solution is considerably modified in its power of contraction, which is desirable for the aforesaid purpose.

The chemical manipulation is extremely disagreeable; the nitrous acid fumes are very abundant, consequently highly irritating to the respiratory organs. Great care is necessary in well washing the cotton; also a moderate heat in drying it. The process is as under:—

Take nitrate of potash, 4lbs.; sulphuric acid, 8lbs.; carded cotton wool, 8 oz.: mix the nitrate and acid in a glazed vessel, add the cotton, and constantly agitate with a glass rod for half an hour; then wash the cotton thoroughly in cold water, so that no trace of acid should be perceptible to test paper; then dry carefully, and the result will be a very soluble gun-cotton; then take 1 oz. of the cotton; rectified sulphuric ether, 16 oz. fluid; when dissolved, add 1 oz. absolute alcohol. Allow the solution to stand twenty-four hours, and the collodion will be ready for use.—*Med. Times, March* 16 *and* 30, 1850, *pp.* 208 *and* 248.

178.—*Various Surgical Uses of Vulcanized India-Rubber.*—Vulcanized caoutchouc has now become very common in the arts, and is likewise used in surgery. A systematic and extensive application of this substance has lately been made at Paris, for surgical purposes; and Dr. GARIEL presented to the Surgical Society of that capital, on the 19th of September last, a series of apparatuses, made of vulcanized caoutchouc, for traction, compression, confinement, dilatation, suction, &c. Dr. Gariel prepares the substance by dipping the caoutchouc into a saline bath, and thereby renders the India-rubber perfectly and regularly elastic, gives to it an immense force of cohesion, prevents fatty bodies or the most energetic chemical agents (nitrate of silver, nitric, sulphuric, and muriatic acids, &c.) from acting upon it, and causes it to preserve its elasticity at extreme temperatures. It should be remembered that ordinary caoutchouc possesses none of the above-named properties. One peculiarity pervades the numerous kinds of apparatuses which Dr. Gariel laid before the Society, and that is, a very ingeniously-contrived mode of insufflating various tubes, when placed upon, or introduced into, the body, giving them a greater diameter, and increasing their power of pressure at will. We may mention a tube used for arresting epistaxis, which will plug the posterior nares by insufflating it. Pessaries and a great number of variously-shaped cushions, intended for many different surgical uses, are also made to change their size at will, by filling them more or less with air. The Society expressed its highest approval of these applications of vulcanized caoutchouc.—*Lancet, Dec.* 1, 1849. *p.* 579.

179.—*Case where a Needle was found in the Heart.*—Dr. NEILL, while dissecting the body of a negro, who had suffered, though not urgently, some time before death, from palpitation, slight dyspnœa, and severe cough, and who had never complained of having received any injury nor manifested any tendency to suicide, found a foreign body in the heart,

which it was ascertained could not have fallen in during the dissection. It proved to be a broken worsted needle, two inches long, imbedded in the external wall of the left ventricle, with its point directed to the apex of the heart. It was much oxidized, and could not be moved from its situation until the cyst containing it was split up. The broken end was contained in one of the columnæ carneæ.

Cases are on record in which needles have penetrated into the heart from without. Dr. Leaming relates one of a seamstress, who thrust a needle through her chest by falling against a table, and who died, after suffering from pleurisy, pericarditis, and pneumonia for nine months. The body of the needle was found imbedded partly in the wall of the right ventricle, and partly in the septum, whilst the point projected a quarter of an inch into the left ventricle. Another is contained in the 'Archives Géneralés,' 1842, in which a soldier ran two needles into his heart, and died in nineteen days. The needles had passed through the heart, and lodged in the lower part of the left lung, therein inducing an abscess. A third case is related by Dr. Graves, in which the needle, after having been run in for the purposes of suicide, was cut down upon and removed. The patient, however, died of pleurisy on the eighth day, and on opening the left ventricle where the needle had entered, a small membranous sac, about the size of a pea, and containing pus, was found. ('New York Med. Examiner.') —*Brit. and For. Medico-Chirurg. Review*, *Jan.* 1850, *p.* 259.

180.—*Case of Suspended Animation: Recovery after Artificial Respiration for Five Hours and a Half.* Reported by Mr. T. Small. —[This interesting case was under the care of Mr. A. Poland, at Guy's Hospital. The following are the details:]

J. M., a stout, healthy, and lively little boy, about four years of age, seized hold, about five in the afternoon, on the 5th of March, 1850, of the spout of a kettle, and swallowed some boiling or very hot water, an accident which is but too frequent among the labouring classes. He was soon attacked with much distress of breathing, which gradually increased up to the time of his admission, at half-past ten in the evening of the same day.

Here the effects of the hot water, stated by Dr. Hall, are not, as might be supposed, *à priori*, the symptoms of inflammation of the œsophagus and stomach, but of inflammation of the glottis and larynx, resembling those of croup, &c. The child, when admitted, was suffering very much; there was great and urgent dyspnœa, hurried and abdominal respiration, a quick and very feeble pulse; the skin was cold, the countenance pale, the eyes half shut, and the child did not take notice of any one unless roused. Nothing had been done by the parents, with the exception of hot fomentations to the throat. The little patient was immediately wrapped up in warm flannels, hot bottles were placed at the feet, and stupes applied to the throat. Shortly after these means were adopted, the child rallied, and as the pulse became fuller and more rapid, seven leeches were applied to the throat, and small doses of calomel and antimony administered. Some temporary relief then ensued,

but a relapse soon took place; the breathing became much worse, (at times amounting only to a gasp), the pulse weaker and scarcely perceptible, and the surface of the body much below the natural temperature.

At one o'clock in the morning, Mr. Poland was summoned to the child, which was then in a state of collapse, the surface cold, face partially livid, pulse very feeble and quick, breathing abdominal and laborious. Mr. Poland, perceiving the great danger of the case, immediately performed tracheotomy, in which operation he, however, experienced some difficulties, owing to the depth of the neck, the small size of the trachea, and the comparatively large calibre of the canula. A little time, therefore, elapsed before the tube was fairly introduced. When this, however, had been effected, it was securely fixed by means of tapes.

No benefit followed the operation; indeed it appeared to have extinguished the little flickering of life left in the child. No natural effort at respiration ensued—no air rushed in when the trocar was withdrawn from the canula; the pulse had already ceased to beat for some time; the surface of the body was perfectly cold; the face of a deadly hue; the lips white; the mouth and tongue of a very low temperature; the eyes half open and glassy, without evincing the slightest sensibility, and the child lay a motionless and apparently lifeless body.

No time was lost in placing a gum-elastic catheter in the canula, and performing artificial respiration, keeping it up steadily, uniformly, and not hurriedly, but slowly, at the rate of twenty-five inspirations per minute. This was persevered in for about four or five minutes, when the pulse began to beat, and the surface to become warm, but still no other signs of life manifested themselves, not even the slightest movements of twitching of a muscle, and no effort was made at natural respiration.

This state of things lasted, unchanged, for ten, twenty, and thirty minutes, and still no restoration came on; there the child lay, like a piece of machinery, requiring an artificial filling of the lungs with air, and a mechanical expiration thereof, in order that the beating of the pulse and warmth of surface might be maintained; for so soon as these means were left off, both pulse and heat of surface vanished. An hour passed on, and still the same condition; changes of assistants were required every quarter of an hour, but no evident progress was made towards restoring animation.

Several times the artificial respiration was suspended to try whether any inherent vital power had rekindled, but no sign of it appeared, for the pulse ceased, and the child became cold. Two hours elapsed, and again another half hour, but still no success. It was now half-past three in the morning; most of the gentlemen present were leaving, giving up all hopes of seeing the child restored to life; it was, however, considered imperative to continue artificial respiration whilst the pulse and heat of surface could be maintained. Mr. Small then undertook the charge of the case, and with the assistance of Mr. Wood, kept up the same means in a very praiseworthy manner for two hours more, making in all *five hours and a half* of mechanical inflation of the lungs.

At last the child gave one natural gasp, drew in a long unaided inspiration, and slowly expired the air. Then succeeded a short interval of repose, and a similar movement was repeated; then again came a very

long pause, when the child was assisted by a puff down the canula; this happily succeeded, respiration became slowly established, the little patient began to rally, opened his eyes, and became conscious. The lips had been moistened with port wine during the period of insensibility.

The child now fell asleep, and awoke in an hour, much revived, and again slept for three hours. The tube required cleaning out very often, as much tenacious mucus blocked it up. This cleansing was, however, readily effected, by placing into the canula a second tube, which could be easily withdrawn, cleaned, and replaced, without distressing the patient. The child was ordered two grains of mercury-with-chalk every sixth hour, to be kept warm, and the inner tube to be cleaned when requisite.

Mr. Hilton saw the case in the afternoon of the third day after admission, and advised calomel, wine, and antimonials, as symptoms of bronchitis and pyrexia were becoming apparent. At the end of forty-eight hours the canula was removed altogether, and respiration readily effected through the wound. Four days after the accident the child had much improved; the mucus secreted was not so viscid, nor in such great quantity; he slept well, but was very irritable, and was ordered to take half a grain of calomel, at night only.

The child progressed very favourably for the next week, all medicine was omitted, and he took nourishment and port wine. The wound in the throat showed no disposition to heal, air and mucus being expelled easily through it. He continued much the same until about twenty days after admission, when it was considered advisable that some attempts should be made to close the artificial opening. This was effected, without any distress to the patient, by applying a piece of lint smeared with simple dressing, over the aperture, a handkerchief being lightly tied round the neck. Air now found its way through the glottis—not so easily, however, as could be wished—but none came through the wound, as it now rapidly healed over.

Soon afterwards the child caught a severe cold; great difficulty of breathing ensued, requiring efforts in expiration, which were chiefly made by the abdominal muscles. A peculiar crowing noise attended each expiration, and it seemed as if there was some obstruction in the larynx, about the vocal cords, and this was the more readily supposed, as no serious inflammation could be detected in either lung by Dr. Rees. This dyspnœa became at one time so urgent, so peculiarly distressing, and produced such a repetition of some of the earlier symptoms, that the question was raised, whether the healed-up wound in the trachea should be re-opened, and a tube again introduced. As the patient, however, improved a little, it was suggested by Mr. Hilton and Dr. Rees that the effects of large doses of calomel should be tried, before resorting to the operation. One grain and a half of calomel was given, every three hours, for two successive days, when, during the second night, he got rid of large pieces of inspissated mucus, and soon breathed easily and naturally. The calomel was decreased, and the child rapidly and steadily recovered. He was presented, cured, April 15th, 1850, forty days after the accident, and is now on his way with his family to North America.—*Lancet, June* 1, 1850, *p.* 670.

181.—*Treatment of Singultus by Sulphuric Acid.* By Dr. SCHNEIDER.—During a long practice, Dr. Schneider has met with many cases of hiccough, occurring in both sexes and at different ages, and persisting with such obstinacy as to give rise to great suffering and exhaustion. His sovereign remedy in such cases is one of the preparations of dilute sulphuric acid, which act with great promptitude. He refers also to the testimony of Dr. Duncan, in favour of this substance contained in the 'Edinb. Med. Comment.', and to that of Dr. Jacobsen, of Berlin.—('Casper's Wochenschrift'.)—*Brit. and For. Review, Jan.*, 1850, *p.* 274.

182.—*On the Treatment of Hematemesis and Melœna.* By Dr. J. M. NELIGAN, Physician to Jervis Street Hospital, Dublin.—[Dr. Neligan remarks that the greater danger of hematemesis and the greater difficulty of controlling it, as compared with melœna, seem to depend on the size of the stomach permitting a large accumulation of blood in its cavity before it contracts; its contraction "being the natural mechanical method by which the bleeding is checked." Thus, he observes,]

In the administration of remedies to stop the hemorrhage, the chief indication to be fulfilled is therefore manifestly to produce contraction of the stomach, whether the bleeding be symptomatic of organic disease or not. With this view we should be guided in the choice of styptics or astringents, and they should be administered in a concentrated form, or rather as little diluted as possible, so as not to distend the stomach. In hematemesis or melœna I place most reliance on the oil of turpentine as a styptic, and on gallic acid as an astringent; the former, by its stimulant property, excites the stomach and intestines to contract, and the latter may be given in the solid form, and is very powerful in small doses. Ice has often been prescribed to check hemorrhage from the stomach; but its tendency, when dissolved, to distend the organ, and to favour further bleeding by diluting the blood that may have previously escaped from the vessels, constitutes, I think, a very serious objection to its employment. As to blood-letting, it is only admissible in those few cases where the hemorrhage seems to be dependent on general plethora, and even in these must be regarded rather in the light of after-treatment than of an immediate remedy.

The diet in all cases of hemorrhage from the stomach or intestines must be absolute. Nourishment should be given in a concentrated liquid form, perfectly cold, and in the smallest quantities at a time; and a return to the usual articles of diet should be permitted with the utmost caution.

I regard gallic acid as our most valuable astringent in hemorrhage from the mucous membrane of the digestive organs, from the uterus—in many cases of bleeding from which I have seen it prove of the greatest service, and from the urinary organs.—*Dub. Jour., May* 1850, *p.* 348.

183.—*On the Use of Ergotine in External and Internal Hemorrhages.* By M. J. BONJEAN, Chambery.—Ergotine when applied to wounds has the property, M. Bonjean states, of facilitating their cicatrization and moderating inflammation of the wounded tissues. Under its

influence union takes place by the first intention, and cicatrization occurs without further assistance.

In certain cases ergotine may perform all the offices of the ligature. M. Bonjean enumerates the following circumstances attendant on a capital operation in which its employment was indicated:—

1. When, in order to arrest a hemorrhage, it would be necessary to disturb the lips of a wound in which cicatrization is commencing.
2. When the patient manifests a tendency to gangrene of the cut surfaces.
3. When the source of the hemorrhage is from vessels imbedded in the inflamed and swollen tissues.
4. When the blood flows from many small arteries of which the orifices cannot be perceived.
5. When hemorrhage occurs from the sloughing of an eschar, as in gun-shot wounds, &c.

In these difficulties the application of ergotine is as often efficacious as the use of pressure is ineffectual. The application of ergotine supersedes ligature of the arteries, and effects cicatrization without interfering with the permeability of the artery.

The mode of employing ergotine is to dissolve it in five or six times its weight of water, for ordinary wounds; and in three or four parts, or even in a concentrated form, for more serious hemorrhages. A portion of the tow or lint is to be moistened with the fluid, and applied with gentle pressure to the surface previously wiped. When the hemorrhage does not return on the pressure being removed, another pledget moistened with the solution is to be laid over the former, and the limb bandaged as usual. Perfect rest is to be observed.

Internal administration.—Ergot of rye has been successfully employed:

1. As an excitant of uterine contractions.
2. As a stimulant to the muscular system in general.
3. In hemorrhages and certain fluxes.
4. In congestion of the uterus.
5. As a stimulant to the nervous system.

The latter poisonous effect of ergot of rye is due, according to M. Bonjean, entirely to its fixed oil. The preceding properties are due to the *ergotine* alone.

Simple extract, or ethereal tincture of ergot, both contain a portion of its poisonous principle. Pure ergotine is in the form of a solid extract of a deep brown colour. In thin laminæ it presents a blood-red colour. It has the odour of roast meat. Its taste is bitter. It is perfectly soluble in water, and this solution yields neither oil nor resin when heated with ether. ('Gazette Méd.')—*Med. Gaz.*, *May* 3, 1850, *p.* 787.

184.—*Use of Chloroform in Abortion.*—[At a meeting of the Westminster Medical Society,]

Mr. I. B. Brown briefly mentioned a case of abortion at the sixth week, in which he was enabled to remove the ovum, which was descending irregularly, and was grasped by the os uteri, by placing the patient under chloroform. The os dilated under its influence, and he removed

the ovum easily; hemorrhage, which had previously existed to a considerable extent, immediately ceased. Mr. Brown contended strongly for the employment of chloroform under such circumstances.

Dr. Tyler Smith, without wishing to call in question the interesting observations of Mr. Brown, had never seen a case of abortion in the early months in which he could not get away the ovum by means of a stimulating enema, such as turpentine, or a solution of cathartic pills, or a purgative mixture. He had seen some remarkable cases in which this treatment had been most successful. In one case, which he had attended with Dr. Cormack, the patient's life had been saved, when at the last extremity, by this proceeding. The use of an enema invariably produced reflex dilatation of the os uteri, and contraction of the uterus itself.

Dr. Cormack could safely assert, that in the case referred to by Dr. Tyler Smith, a turpentine enema had saved an aborting woman from impending death.—*Lancet, Feb.* 23, 1850, *p.* 249.

185.—*Insanity Produced by the Use of Chloroform during Labour.*—[At a meeting of the Westminster Medical Society, a few months ago,]

Dr. Webster related the following case, communicated to him by a professional friend, in consequence of perusing in 'The Lancet' a report of the three similar instances he had mentioned at a previous meeting of the Society. Only one drachm of chloroform, sprinkled upon a handkerchief, was used; but the effect it produced was so sudden and violent, that the patient, after inhaling, remained quite insensible, which greatly alarmed the attendants; with the insensibility there was likewise deadly paleness of the countenance; however, she slowly rallied, but had a painful and protracted labour. During several days subsequently, the lady continued in a very nervous condition, although not then actually incoherent, but she soon became so furiously maniacal as to require coercion by a strait-waistcoat. After being insane during many months, the patient gradually recovered her reason, and ultimately got convalescent. —*Med. Gazette, Jan.* 4, 1850, *p.* 33.

186.—*Rule for Administering Chloroform.*—M. Dudart, a dentist, who has had very extensive experience of chloroform, proposes the following rule for determining the degree to which the inhalation of this energetic agent should be carried.

On the one hand, it is necessary to produce a certain amount of insensibility, and on the other, it is dangerous to push this insensibility too far. By what sign are we to know that the inhalation has been carried to the proper extent? M. Dudart thinks we may find this sign in the species of *trismus* which affects the elevator muscles of the lower jaw. When the jaws and teeth are pretty firmly pressed against each other, and some force is required to separate them, we should suspend the inhalation, and may perform the most painful operation in full security, for the patient has ceased to feel.—*Med. Times, Feb.* 16, 1850, *p.* 117.

187.—ON THE PATHOLOGY AND TREATMENT OF DELIRIUM AND COMA.

By Dr. R. B. Todd, F.R.S.

(Continued from p. 71 of this Volume.)

[The last form of delirium described by Dr. Todd is what he terms "*toxic delirium*," under which head he classes delirium tremens. Respecting the post-mortem appearances of the last-named disease, he says:]

If the patient die in a first or second attack, the brain and its membranes will exhibit no indication whatever of disease: but, if he has had several attacks, there will be signs of considerable alteration in the nutrition of the brain and its membranes. These changes are very similar to those which are found after frequent and repeated attacks of epilepsy. They consist of the following:—More or less of thickening and opacity of the arachnoid; enlargement of the Pacchionian glands; shrinking of the convolutions of the brain, and enlargement of the intergyral sulci.

The tendency, in general, of these cases is to recovery; but, after repeated attacks, the danger to life is greatly increased, because of the deranged state of cerebral and general nutrition.

And it is important to remark, that, as in most of the other forms of delirium to which I have referred, a low state of the system,—the loss of blood,—powers enfeebled by a too rigid or too long continued antiphlogistic treatment,—are highly favourable to the production and the persistence of this delirium.

This form of delirium is highly interesting, because it is clearly due to the introduction of alcohol into the blood, which tends to poison the brain, and seriously to impair its nutrition. It may, therefore, be regarded as typical of a class of delirious cases, arising from the introduction of a poison into the system, and which may be designated as cases of *toxic delirium*.

The form of delirium which I have just described is very closely imitated by the habitual use of opium; the same tremulousness,—the same impairment of the powers of thought and memory,—the horrors,—are all met with, as the result of the long-continued ingestion of this drug.

When alcohol is taken into the system in large quantity at once, it produces, in many persons, a violent state of delirium, which does not cease until the greatest part of the alcohol has been eliminated.

The inhalation of chloroform, of ether, and of other substances of this kind, will produce a kind of delirium when the inhalation reaches a certain point, but which speedily passes into coma when the inhalation is carried beyond that point.

Indian hemp, henbane or hop, belladonna, conium, and, indeed, the whole class of narcotic drugs, are capable of producing, especially in some persons, delirium of this kind.

The poisons of the exanthemata, too, produce delirium: that form of delirium which often developes itself in the premonitory fever of scarlatina, measles, small pox, is of this kind, and will often disappear as soon as the characteristic skin affection becomes fully developed; or, in some severe cases, will continue throughout all the stages of the disease,

until the poison has been fully eliminated from the system; or, again, in others, it will show itself only in the more advanced stages of the malady, when some check has been given.—*Med. Gazette, May* 10, 1850, *p.* 790.

[Dr. Todd next directs our attention to the clinical history of *Coma*, and shows that it is developed under a great variety of conditions, in close analogy with those which give rise to delirium. Thus we have *epileptic, hysterical, traumatic, anæmic, typhoid, rheumatic*, and *toxic* coma; and there is also coma *from compression*, but here the analogy with delirium fails. As our space will not allow us to introduce Dr. Todd's admirable exposition of the history of all these varied forms of coma, we must refer the reader to the lectures themselves. We extract however the following remarks upon an interesting question connected with the subject of "coma from compression".]

May increased sub-arachnoid effusion cause coma?—It is a popular notion, adopted on very feeble grounds, that compression of the brain, and consequently a comatose state, may be caused by the accumulation of fluid around the brain or in the ventricles. There are some very good reasons for adopting the contrary opinion, that the existence of fluid in the subarachnoid space never does compress the brain, and cannot be regarded as a cause of coma by compression.

1st. It is clearly proved by the researches of Cotunnius and of Magendie, confirmed by the best subsequent observers, that a certain quantity of fluid in the subarachnoid space, both in the cranium and in the spine, is essential to health, and that this fluid is in greater abundance in the old, where the brain has begun to shrink, than in the plump well-developed brain of the young and adult.

2dly. That in cases where the largest collections of fluid have been found around the brain, that organ has been found shrunk, not compressed: the brain has wasted, from a defective nutrition; there is no flattening of the convolutions, nor condensation of the brain substance, but a shrinking of the convolutions,—a widening of the sulci between them without any morbid change, either one way or the other, in the density of the substance of the brain. Thus it may be laid down that the quantity of subarachnoid fluid *is in the inverse ratio of the bulk of the brain*, and that with a large, well-developed brain we shall find but little subarachnoid fluid; whilst in the small, shrunk, and wasted brain, the accumulation of that fluid is considerable.

When the wasting, or shrinking, or collapse of the brain is partial—limited to the region of two or three convolutions,—a partial accumulation of fluid will take place in the situation of the shrunk part. A softening of a portion of the cerebral hemisphere will often cause a collapse of the convolutions above it, and thus space will be created for the accumulation of fluid.

3dly. I think it may be laid down that the accumulation of any large quantity of fluid in the ventricles, or the development of a tumour in the substance of either hemisphere, or the formation of a clot of blood there, is incompatible with the existence of a surrounding subarachnoid fluid. The pressure from within displaces the subarachnoid fluid, and

prevents the secretion of it. Thus, we never find the two fluids, intra-ventricular and subarachnoid, existing together *in large quantity:* they may exist together *in small quantity* in shrunk, small, and ill-nourished brains, and more especially where the defective nutrition chiefly affects the hemispheres and the convolutions.

For these reasons I have long adopted the opinion that the effusion of a large quantity of subarachnoid fluid is a result—and a result probably of a conservative kind—of the shrinking or diminished bulk of the brain from some cause, and that in no case does the accumulation of fluid around the brain cause compression of that organ, nor can it be regarded as a cause of coma.—*Med. Gazette, May* 17, 1850, *p.* 836.

[The conclusions to which the facts detailed in Dr. Todd's lectures have led him, with regard to the clinical history of delirium and coma, are thus recapitulated:]

1st. That the introduction of certain poisonous agents into the blood, either directly or through the digestive organs, is capable of producing delirium and coma.

2ndly. That a deteriorated and poisoned condition of the blood is favourable to the production of delirium and coma, as in the cases of rheumatic and gouty delirium and coma, and of the delirium and coma of typhus, erysipelas, and the exanthemata.

3dly. That the same state or states of brain which are favourable to the production of epileptic convulsions are likewise favourable to the development of delirium and coma.

4thly. That the anæmic state, or that state of blood in which the colouring matter is very deficient, is highly favourable to the production of delirium and coma.

5thly. That a shock to the brain *concussion*—may produce coma, and likewise delirium; and that compression of the brain will produce *coma*, but not delirium.

And, lastly, that in all these cases the delirium or the coma may occur in their highest degrees without the slightest evidence of any inflammation of the brain or of its membranes.

But I must state, in addition to all this, that although, in the vast majority of instances, delirium and coma, even in their most highly developed states, occur independently of inflammation, nevertheless inflammation of the membranes of the brain is undoubtedly capable of producing both delirium and coma, and that it is often a matter of great difficulty to distinguish between the inflammatory and the non-inflammatory affections of this kind. The subject of inflammation of the brain is a large and most important one, which the time allotted to these lectures will not permit me to discuss now. I must content myself with observing that inflammation of the brain is, in adult subjects at least, a rare disease; and, therefore, that delirium and coma arising from this cause is of rare occurrence as compared with those other forms which I have described, and that the inflammatory delirium is generally of a low kind, resembling that of typhus, and has a great tendency to pass into coma; and further, that it is frequently ushered in by vomiting, and accompanied by a marked sluggish and slow state of the pulse.

We now proceed to inquire whether any adequate theory of the pathology of delirium and coma can be formed in the present state of our knowledge, both physiological and clinical? This inquiry involves answers to these queries:—1. What part—what organ—is affected in delirium and coma? 2. What is the nature of the affection, and is that affection the same for each and all those various forms of delirium and of coma which clinical study teaches us are apt to occur?

With regard to the first question, it is quite clear that we cannot assign any other seat for these remarkable states than the nervous system: nor can we locate them in any other part of the nervous system than in that part which is connected with the actions of the intellect, and with that reciprocal influence between mind and body which constitutes consciousness. Can we assign them their seat in the spinal cord? Certainly not; for we know that mental phenomena are completely independent of the spinal cord. The mind may act even when the connection between the cord and the brain is cut off, of which we have many proofs both in clinical observation and in physiological experiment. The removal of the hemispheres of the brain will destroy the phenomena of thought and of consciousness; but the spinal cord may be taken away piece by piece, leaving intact the centre of respiration, and mental phenomena will continue unaffected, save so far as concerns the partial affection of consciousness which necessarily must result from severing the connection between the encephalon and those parts of the body whose nerves are implanted in the separated portions of the spinal cord. We are conscious of the existence of our limbs through the connection of them with the spinal cord, and the connection of the spinal cord with the brain. So long as the trunks of the nerves of a limb are implanted in a state of integrity in the spinal cord, and so long as the connection between the cord and the brain is intact, so long will the consciousness of the connection of that limb with the body remain,—so long will the mind continue to have the feeling of the connection of that limb: and it is remarkable that that feeling may be fallacious; for it will exist even after the limb has been amputated, if only the conditions which I have mentioned are present—namely, the integrity of the trunks of the nerves, and of their implanted roots. Nor can it be got rid of even after a long interval of years has elapsed from the time of the amputation.

The brain or encephalon, then, is that part of the nervous system which is most directly and most intimately connected with the mind - upon which the mind exercises a direct influence, and which, in return, exercises an influence upon the mind.

Yet the brain itself is a most complicated organ in man and the higher animals; and therefore we shall have to inquire what parts of this organ are essential to a normal manifestation of the intellectual actions, and to the maintenance of consciousness.

Time would fail me were I to enter upon a full physiological discussion of these points. I must content myself with stating that there are the most conclusive reasons for regarding the convolutions of the brain as that part which is connected with intellectual change—as "the centre of intellectual actions." It is the part of the brain which is most intimately connected with, and most readily affected by, the mind; and

it is that layer of grey or vascular matter so intricately folded upon the surface of each cerebral hemisphere which is the seat of those unceasing changes which thought may produce, or which may excite thought. It is, therefore, reasonable to believe that any departure from the normal condition of this centre would create a corresponding disturbance or derangement of the intellectual action; or, if we admit that the mind may be disturbed primarily and independently, as I think must be admitted, then it may be stated that that primary disturbance of the mind may derange and disturb the nutrient actions of this centre.

Consciousness is feeling: the simplest act of sensation indicates consciousness -such an act is the most simple condition of consciousness; any intellectual act is also an indication of consciousness. "When I smell a rose," says the late Mr. Mill, "I am conscious; when I reason, I am conscious; when I remember, I am conscious; when I believe, I am conscious; * * *" "If we are in any way sentient, that is, have any of the feelings whatsoever of a living creature, the word conscious is applicable to the feeler, and consciousness to the feeling."

It is important further to remark, that "the sensation is not the object of consciousness different from itself, but a particular sensation is *the consciousness* of the moment; as a particular hope, or fear, or grief, or resentment, or simple remembrance, may be the actual consciousness of the next moment."

In order, then, to understand the physiological conditions necessary for the maintenance of consciousness, we must analyse a simple act of sensation. When I smell a rose, what are the physiological phenomena? First, there is an impression made upon the sentient nerves; secondly, the change wrought in these nerves is propagated to the centre of sensation; and thirdly, this change produced in the centre of sensation *must be perceived* by the mind in order that a true act of sensation shall be accomplished. Thus, in the act of sensation we have two classes of phenomena—one physical, proceeding from periphery to centre; the other mental or intellectual, by which all physical change is recognised. The impression of the odoriferous particles on the olfactory nerves, and the subsequent change in the centre of sensation, is the physical part; the perception by the mind of that change is the mental or intellectual part. My mind may be occupied with some engrossing subject at the time the rose is presented to the organ of smell: the physical phenomena will, nevertheless, take place; odoriferous particles will impinge upon the olfactory nerves, and the change will be produced in those nerves, and in the centre of sensation, but the mind being occupied with some other object will not perceive the change in that centre, and therefore there will be no sensation: I shall not be conscious that such an object was presented to the organ of sense.

Thus, then, for this simplest act of consciousness, the co-operation of two parts of the brain is necessary—namely, the centre of sensation, or that part which is destined to receive sensitive impressions, and the centre of intellectual actions. The failure of the right mode of action of either of these will prevent the completion of the act of sensation. Either the physical part may fail, or the mental part.

When a man is brought under the influence of chloroform, he is

incapable of sensation—partly because the centre of intellectual actions is paralysed by the influence of the chloroform, and partly because the nerves are similarly affected.

But when a man in traumatic delirium is insensible to the irritation which must be created when he moves the injured or broken leg, or in rheumatic delirium, the rheumatic joints, he is so because his centre of intellectual action is entirely engrossed with the rapid train of ideas and fancies which occupy his mind; and therefore he does not perceive the irritant change which must be produced in the nerves of the limb by the movement and displacement of the injured part.

Now the centre of intellectual actions is the hemispheric lobes of the brain or the convolutions: the centre of sensation is, as I have shown in my Lumleian lectures of last year, and also elsewhere, the optic thalami and their downward continuations, the olivary columns of the medulla oblongata, and the posterior horns of the grey matter of the spinal cord.

These, then, are the parts which are concerned in consciousness; and an affection of either or both of a certain kind must more or less affect the consciousness: an affection of the centre of sensation, by cutting off the object of consciousness—an affection of the intellectual centre, by impairing or destroying the power of perception.

An affection, however, of the centre of sensation *alone* cannot impair or destroy consciousness, because still the centre of intellectual action remains intact. Such an affection may destroy particular kinds of consciousness; but still there remain thinking, belief, memory—all which are acts of consciousness, although the evidence of their integrity rests chiefly with the individual himself. But an affection of the intellectual centre may impair or destroy consciousness even although the centre of sensation remain uninjured in any way; for it is evident that no impression, however vivid, upon the centre of sensation, can become a sensation, if the action of the intellectual centre be suspended, and the power of *perception* be thus destroyed.

Thus, then, we arrive at this conclusion, that to impair or destroy consciousness, the part of the brain which must be injured or suspended in its action must be the hemispheres—the convoluted surface—either alone or in conjunction with the centre of sensation—namely, the optic thalami and their downward continuations.

Now delirium is an affection of the intellect: coma is an affection of the consciousness.

The seat of diseased action which may cause delirium is, therefore, the centre of intellectual actions—the convolutions of the brain—or such parts as are so intimately connected with them that the nutrition of the one cannot be disturbed without the disturbance of that of the other.

The seat of the diseased action which may cause coma is the same centre; with or without the centre of sensation; or the morbid process may begin in the centre of sensation, destroying certain kinds of consciousness, and may extend to the intellectual centres, making the coma complete.

From this circumstance, then, namely, the sameness of the seat of the morbid changes which are capable of producing the two states of coma and delirium, we obtain some clue to explain the remarkable analogy

which we have observed to exist between the two affections as regards the circumstances under which they are apt to occur.

Having thus fixed the seat of the morbid processes which cause delirium and likewise coma, we come next to inquire what is the nature of those morbid processes.

We may obtain, I think, very satisfactory information upon this subject by referring to the circumstances under which the various forms of delirium and coma occur.

1. We know that the inhalation of chloroform and of ether will cause both delirium and coma; that the ingestion of alcohol, of opium, of Indian hemp, and other narcotic drugs, will cause delirium and coma.

A moderate dose of any of these poisons will cause delirium; a large dose will cause coma.

It seems necessary for the production of these morbid states that the poisonous material should find its way into the blood; and we know that their direct introduction into the blood is the most effectual way of creating the two states.

In such cases, then, the cause of the delirium and coma is clearly humoral. A poison circulates in the blood which has an affinity for the vesicular nervous matter of the brain, and which, therefore, disturbs its nutrition. No part is more obnoxious to the influence of any poisonous agent which may be circulating in the blood, than the vesicular matter of the convolutions of the brain; for no part is more abundantly supplied with blood-vessels. The pia-mater which lies in contact with the whole of this undulating surface is a membrane of blood-vessels from which innumerable minute vessels penetrate the vesicular matter. A piece of this grey matter of the convolutions successfully injected, appears perfectly red, from the multitude and the proximity of the blood-vessels; and there is no other vesicular matter in the brain except that of the laminæ of the cerebellum which is so largely supplied with blood-vessels.

It was Flourens, so far as I know, who first broached the ingenious idea of a special elective affinity between certain poisons and certain parts of the brain, whereby he explained their tendency to act primarily and specially upon one part in preference to another. Thus alcohol will act primarily upon the cerebellum, and give rise to the unsteady gait of the drunkard by impairing the co-ordinating power of that centre; carried to a higher dose it affects the intellectual centre and causes delirium, and ultimately coma. Belladonna affects primarily the centre of sensation, and particularly the special centre of implantation of the optic nerves: whence the dilated pupils and the amaurosis which arise from the use of this drug; and afterwards, the belladonna, having paralysed the centre of sensation, destroys the powers of the intellectual centres, and causes coma.

Now what is the immediate physiological effect of a large quantity of any of these narcotics on the brain?

On examining the brains of persons dead of poisoning by opium or by belladonna, the vessels of the brain are found turgid with fluid blood.

It is this congestion, some will say, which causes first the delirium, and afterwards the coma. The effect of the opium is to cause congestion: the effect of the congestion is to compress the brain.

But this explanation will not bear the test of careful examination. The congestion is rather the effect of the injury done to the brain and to the blood by the opium, whereby the attraction of materials from the blood, suited to the nutrition of the brain, is retarded, and ultimately stopped. Now this force of attraction between the blood and the tissue is a powerful agent in the maintenance of the capillary circulation: when, therefore, it is impaired, the blood moves slowly and feebly through the capillary system, and there is need of increased force on the part of the heart to keep up the circulation at all. Hence, then, in cases of this kind, the congestion is due to the condition of the blood itself—in fact to its contamination by the poison which has been introduced into it.

Nor can we discover in the brain tissue itself any evidence of its having undergone compression, such as one might fairly look for as the result of over-distension of the blood-vessels.

Furthermore, if we look at the mode of accession of delirium tremens, we shall find that there is another condition requisite for the development of the malady besides the ingestion of alcohol. This is an exhausted and depressed state of the whole system caused by the withdrawal of the stimulus, or by the use of antiphlogistic remedies, or by the loss of blood, or by the privation of food.

I shall give a good illustration of this in a case which occurred to myself. I had on several occasions attended a gentleman of high professional position for illnesses brought on by the use of brandy and wine in undue quantity. These illnesses always consisted in attacks of vomiting, with tenderness of the epigastrium, and more or less of sleeplessness. I found that the best means of correcting these symptoms was by small doses of calomel and opium,—starvation,—and iced water.

He had one of these attacks the end of last year, which yielded very readily to the treatment pursued, in the course of three days, and on the fourth day I allowed him a mutton chop and one glass of wine. I should have been more liberal in my allowance had I known that during the previous night he had threatenings of the horrors. In the evening of the day on which he had the chop and wine,—the first food of a substantial quality which he retained on his stomach for some days,—he began to have illusions, to fancy he saw persons in the room, and to see black-beetles crawling over him. This, however, passed off, and he slept for an hour or two. When he awoke, the illusions came on stronger than before: he got up in a rage, and went to his servant's room adjacent, collared him, and accused him of introducing strange men into his room for the purpose of robbing him. The delirium now manifested itself in full force, but yielded very readily to the free administration of alcohol and opium.

A preliminary condition, however, necessary to the development of delirium tremens is a deterioration of the blood by alcohol. No doubt exists now that in cases of poisoning by alcohol the alcohol enters the blood, and by a very rapid absorption. It seems certain that alcohol is one of those substances which is directly absorbed into the blood-vessels of the stomach without undergoing any change in that organ; for MM. Bouchardat and Sandras have detected it in the veins of the portal system; and Dr. Percy has added to our knowledge the important and interesting fact, that alcohol appears to have a special affinity for nervous mat-

ter, for he found it in animals poisoned by alcohol, in the brain in large quantity, and in considerably greater proportion than in an equivalent quantity of blood,—a highly significant fact, explanatory of the injury done to the nervous system by the habitual use of stimulants of this kind in undue quantity.

When alcohol is taken into the system, then, it enters the blood directly unchanged, and it is eliminated partly as alcohol,—at the lungs, at the liver and the kidney, for Dr. Percy detected it in both those fluids. Now at each of these places it must injure the blood,—at the lungs, by attracting a portion of the oxygen which ought to go to the blood itself, thereby diminishing the oxygenation of that fluid,—at the liver and kidneys, by interfering with the eliminating power of those organs for their appropriate materials; for there can be no doubt, from the frequent occurrence of disease of the liver and kidneys in habitual drunkards, that it must materially affect the nutrition, and therefore the secreting power of those glands.

But as the alcohol is eliminated only in very small quantities at the three points I have mentioned, it is highly probable that it undergoes chemical change in the blood; that it attracts the oxygen of the blood, and becomes converted into carbonic acid and water. Thus it would rob the blood of some of its oxygen,—it would supply carbon in perhaps deleterious quantity,—and it would increase the quantity of water. This increased proportion of water in the blood would seem to be by no means favourable to the natural changes of the blood itself, by which I mean more particularly those connected with the development and growth of the blood particles,—especially the red particles.

Hence we so commonly find habitual drinkers pale and flabby, as if their blood contained too much water and too little colouring matter; and, in the absence of any satisfactory analysis of the blood of such persons, it may be stated that the fluid is probably defective in its solid ingredients, especially its colouring matter, and contaminated probably by some of the principles of the bile and urine, and by some other compound derived from a depraved secondary assimilation of the brain.

We are as yet greatly in want of sufficiently numerous and accurate analyses of the blood and urine in this as in all the varieties of delirium. Dr. Bence Jones some years ago pointed out that in cases of delirium tremens the discharge of phosphates by the urine is almost completely suspended; but these observations were made upon very few cases, and I am not aware that they have received confirmation from subsequent observers. In a few analyses of the urine of patients labouring under chronic epilepsy, and addicted to habits of intemperance, made for me by my friend Mr. L. Beale, jun., (than whom I know no more competent chemist,) I have not found a deficiency of phosphates, but rather an increase. But this is clearly a point requiring extensive and minute investigation, great precaution being used as to whether the phosphates discharged are due to any peculiarities in the food, or to any excessive waste in the nervous matter, of which phosphorus forms an important ingredient.

I think I have now stated enough to enable me to enunciate a theory of the pathology of delirium tremens. I would lay it down, then, that it is a delirium essentially humoral in its origin,—due to a perversion

of nutrition, and especially of the nutrition of the brain, by the slow and constant ingestion of a poison -namely, alcohol; and that the poisonous element which contaminates the blood, and which is left free to exercise its destructive and irritating influence upon the brain, when the powers of the system are exhausted, and the blood impoverished by bad living, and the employment of depressing remedies; that this poisonous material is a compound partly of alcohol itself, partly of some material derived from a depraved destructive secondary assimilation of the brain itself,—a material analogous to, if not identical with, that which probably is apt to be developed in the blood in epilepsy, and which by its periodical accumulations gives rise to the paroxysms of that disease.

This view of the pathology of delirium tremens will, if carefully compared with what we know of its clinical history, afford an adequate explanation of that disease. The peculiar affinity of alcohol for the nervous tissue explains the early signs of enfeebled nervous power manifested by habitual spirit drinkers; the assumption of the existence of a poison in the blood distinct from alcohol, but generated in consequence of the habitual ingestion of that fluid, will explain the production of the delirium in the absence of the accustomed alcoholic stimulus; and the control which experience tells us may be obtained over the delirium by giving new supplies of alcohol, and by opium, indicates that the peculiar state of the blood which is generated by a long continuance of an enfeebled and depraved nutrition is highly favourable to the production of the phenomena.

Moreover, we find in this view of the pathology of delirium tremens a satisfactory explanation of the absence in recent cases of all signs of lesion of the brain, and the presence in cases of long standing of morbid changes precisely resembling those seen in chronic epilepsy. The ingestion of alcohol, even in large quantity, does not produce acute inflammation of the brain: it exalts the nervous power it excites the battery to its highest point,—but it does so at the expense of an extreme waste of the nervous material, and of the generation of a new matter, which is deposited on the membranes and among the bloodvessels, giving rise to those opacities and thickenings of the membranes which are found in the advanced stages of this disease, as well as of epilepsy. I have several times examined the opacities of the arachnoid membrane, which are found in cases of this kind, and have always found them to consist of an accumulation of a fatty material analogous to what we find in the coats of arteries, and which is deposited in the tubes of the kidney, or in the cells of the liver, and which sometimes takes the place of the true sarcous or fibrinous element within the sarcolemma of the muscular fibre.—*Med. Gazette, May* 24, 1850, *p.* 877.

[Having thus arrived at an explanation of delirium tremens, Dr. Todd proceeds to enquire whether the other forms of delirium admit of a similar or analogous explanation. He says:]

That form of delirium, which most closely resembles it, is the renal epileptic: and this affords very striking points of analogy with delirium tremens as to the circumstances which accompany its development.

Thus, the blood is the seat of a long course of chronic poisoning due to the defective action of the kidneys and the insidious chronic disease of

those organs —due, also, perhaps, to the ingestion of deleterious materials; for the subjects of this disease are frequently addicted to intemperate habits both in eating and drinking.

There is a prevailing opinion that the blood is poisoned in cases of this description by the accumulation in it of urea which the kidneys are unable to eliminate. The foundation of this view was the celebrated experiment of Dumas and Prevost, which consisted in the extirpation of the kidneys from a dog, which afterwards died with symptoms referrible to disturbance of the cerebral functions, and urea was discovered in large quantities in the blood. A similar result followed a repetition of the experiment upon dogs, cats, and rabbits, by Mayer, and also by Vauquelin and Ségalas; and in every case urea was found in abundance in the blood. Now there can be no doubt, that, in a large number of the cases of chronic disease of the kidney, urea is prone to accumulate in the blood; and it is highly reasonable to suppose that when it reaches a certain point in quantity, or when the blood assumes a certain degree of poverty favourable to the exosmose of its poisoned serum among the elements of the tissues, then the signs of poisoning appear—in the delirium, or in the coma.

Very recently, my friend, Dr. Owen Rees, whose opinions are entitled to the utmost respect, has cast a little doubt upon this view of the poisonous effects of urea, by the narration of a case in which there were no symptoms of poisoning, but the poison was present: a larger quantity of urea was detected in the blood than he had ever found before in a case of Bright's disease. But Dr. Rees throws out a suggestion that probably a certain tenuity of the blood is necessary to ensure the poisoning influence of the urea. In this view I fully concur, and believe that the particular exception to which Dr. Rees referred was caused by the state of the blood; for all analogy shows that a poisoning influence will take place more rapidly with a thin blood than with one of normal density.

Dr. Christison, indeed, had already referred to cases, in which the urea was present in the blood without any poisonous effects. But these were exceptional cases; and there is no reason to deny that the tolerance of the poison might have been due to a peculiarity in the blood itself.

In the recent epidemic of cholera we had too many proofs of the connexion between imperfect excretion by the kidney and delirious and comatose affections. How many were the cases of individuals who, having weathered the dreadful storm of the early and more violent symptoms, afterwards passed through delirium and coma to death; poisoned in some cases in a manner strikingly similar to that by opium, and always connected with the defective action of the kidneys! And how rapidly, and even suddenly in many instances, were the symptoms removed by a free discharge of urine! In these cases I apprehend there can be no doubt that the poison was urea.

The view, then, that urea accumulating in the blood may poison the brain as alcohol and opium do, appears to me to be a highly reasonable one.

The characters of the blood in cases of chronic renal disease have been well studied, and these are identical with those which we infer to belong to the blood of patients labouring under delirium tremens. They are, an increased proportion of water—a diminution of albumen—a diminution in a very marked manner of the red particles. This condition

of blood is very favourable to serous transudations through the parietes of the vessels, and very unfavourable to the removal of effete matters from the tissues. The exosmose from the blood-vessels would doubtless be immensely in excess of the endosmose unto them.

Thus, we have in this form of delirium, a chronic gradual perversion of nutrition—the development of a poison in the blood an impoverished state of that fluid: all, conditions which we have seen to exist in delirium tremens.

There can, I think, then, be no doubt that the pathology of delirium tremens, and of the renal epileptic delirium, is essentially the same.

Nor does it appear to be at all unreasonable to view the *simple* epileptic delirium as of the same nature,—that is, due to a contaminated and impoverished state of the blood. In the Lumleian lectures last year I brought forward several facts and arguments to show that both chorea and epilepsy are diseases of humoral origin; that the epileptic paroxysm is probably caused by the accumulation of a morbid matter in the blood, which excites the polar force of the nervous matter of the brain, and so may give rise to delirium, or convulsions, or coma. If this morbid matter be determined in certain quantity to the centre of intellectual action, we have delirium; if determined at the same time, in the same, or in greater quantity, to the centres of emotion and of sensation, we have convulsions and coma.

The hysterical delirium is much of the same nature as the epileptic,—just as the hysterical paroxysm is nearly allied to the epileptic fit, and often so much resembles it as to render the diagnosis a matter of considerable difficulty. There is no one of the nervous diseases which more clearly belongs to the class of humoral diseases than hysteria. It would be easy to adduce a host of facts in proof of this statement. Nor can we ever, in the most aggravated states of hysteria, ascertain the existence of any morbid process in any part or parts of the body which can at all account for the phenomena. It is common to attribute them to a sympathy with the uterus; but there are objections which appear to me to be fatal to this doctrine. First, the organ which is supposed to be thus capable of disturbing the nervous system is but poorly supplied with nerves, and has a very slight connexion with the nervous system; secondly, in many of the cases of even the most severe hysteria, the uterine affection is *nil*, or of a very trifling nature; thirdly, we have an affection of precisely the same nature in men, without any derangement in the generative organs, or, at least, without such derangement as may be viewed as the cause of the nervous symptoms.

The uterus, however, may be, and often is, a source of contamination of the blood. There may be a great drain from the uterus by excessive menstrual flux, which impoverishes the blood; some of the morbid secretions formed at the uterus may re-enter the circulation, and so contaminate the blood: or, again, the ovaries may be defective in their action, and so matters which ought to be separated at each catamenial period may remain in the circulation, and contaminate the blood. In this way the generative organs become a source of much disturbance to the general nutrition of the body. But, besides all this, there is frequently in hysteria a very imperfect action of the digestive organs, and the liver and kidneys are much deranged; and the moral state into which patients of

this kind are apt to fall is very favourable to maintaining this enfeebled state of the digestive function, and of general nutrition.

It is not, therefore, in any degree, an unreasonable view of hysterical delirium to attribute it to a similar or analogous state of the system to that which produces epileptic delirium.

It will not be difficult to apply the same reasoning which has led me to these conclusions respecting the pathology of the epileptic and hysterical delirium, to that of the rheumatic and gouty forms of delirium.

In the latter state the recent researches of Dr. Garrod render it highly probable that in every instance lithic acid exists in the blood in such quantity as to justify our regarding it as "poisoned" by that material, or by some compound of it. What is the nature of the poisonous material in the rheumatic states we have yet to determine; but it cannot be doubted that some analogous matter to that of gout is present in the blood. In both states the aspect of the patients denotes a certain poverty of blood, which is greater in the more advanced stages of the diseases, and which is also more manifest when bleeding, and other active antiphlogistic measures of treatment, have been pursued.

In the case of a robust man, on the third day of rheumatic fever, who had not been bled, and with whom no active antiphlogistic treatment had been adopted, the red particles had fallen to less than 100 in 1000 parts; and, when we consider the pallor of patients in the advanced stages of this disease, it cannot be doubted that its tendency is to impair the regenerating power of the red particles.

If now we add to this, that in rheumatic fever the symptoms of delirium generally occur simultaneously with the lighting up of an inflammation of the heart, we shall be led to compare the sudden appearance of delirium in rheumatic fever, under these circumstances, with the sudden appearance of delirium tremens under the influence of exhaustion.

The effect of inflammation of the heart, more especially when it assumes the form of pericarditis, must be to weaken its power,—to induce a state of imperfect palsy. This, indeed, must be the case, unless we suppose the heart to be exempt from the laws which influence other muscles. We often have proof of this in the weakened, depressed, intermittent state of pulse which accompanies and betokens the first invasion of pericardial or endocardial inflammation.

Thus we may lay it down that the delirium of rheumatic fever is due to the brain being supplied with an impure blood which tends to derange its nutrition, and that this derangement of nutrition will take place in a more decided manner if the heart be enfeebled, so that the blood is feebly propelled, and the brain is imperfectly supplied. A similar derangement of nutrition affecting the centre of emotion (the region of the corpora quadrigemina) will give rise to those choreic convulsive movements which we know sometimes accompany the first invasion of delirium, or occur independently of it.

The cerebral battery being excited by a thin watery blood, deficient in its colouring matter, and perhaps also in some other of its staminal principles, and which at the same time contains a poisonous element, it is easy to understand how it will exhibit more rapid and active chemical and physical changes; and consequently will develope the nervous force

with a rapidity and force which disturbs the mind, exciting repeated and irregular acts of thought, and refusing to be controlled by it.

In gout we have likewise the deranged state of blood, especially in the more aggravated cases—as in the asthenic gout: there is the same poorness of blood, with deficient colouring matter, and the blood is poisoned by lithic acid, or whatever other material it may be which forms the *materies morbi* in this disease; and, although in these cases we have not the acute endocardial or pericardial affections which are apt to occur in rheumatic fever, the heart's power is very apt to be weakened, as if the nutrition of its muscular structure were much enfeebled, or from chronic valvular disease interfering with the circulation through the heart. Intermission of the pulse is a frequent symptom of a gouty state of the system; nor is it by any means a necessary attendant upon valvular disease, but will manifest itself in cases where the valves are perfectly sound. In such cases it would seem to arise from some impairment of the innervation of the heart or of the muscular force of the heart—due, probably, to the depressing influence of the gouty poison.

Thus, then, I would lay it down that in the rheumatic and gouty forms of delirium, the disturbance of the brain's function is due to the depression of the heart's action, caused by inflammation in the one case, and by the depressing influence of the poison of gout in the other. The state of brain which causes delirium in these cases is a state of irritation arising not from sympathy with the inflammatory irritation of the heart, but, as Dr. Watson and Dr. Burrows express it, from a disturbance of the cerebral circulation occasioned by embarrassment of the heart's action; and I would go farther, and say that not only is it due to an embarrassed action of the heart, but to the circulation with diminished force of an impure and impoverished blood through the brain.

And to the same cause—namely, an imperfect supply of blood, and an impure and impoverished state of that blood, and to a consequent exalted or depressed polarity of the nervous centres,—would I attribute all the other abnormal nervous phenomena which accompany these rheumatic and gouty affections; the choreic and the tetanic convulsions,—the coma; for such a view is more in accordance with the production of these affections in ordinary chorea and tetanus, and, on this account, more reasonable, than that which assigns them to a peripheral irritation propagated along certain nerves to the nervous centre in which they are implanted, and also because the evidence to prove that such a peripheral irritation really exists in every case, is very imperfect.

It will be remembered that delirium is apt to take place in rheumatic fever, when the internal inflammation is pleurisy or pneumonia, without any cardiac inflammation. Here the element of the embarrassed heart's action is wanting, unless we suppose that a severe pleurisy or pneumonia would embarrass the action of the heart. And again, it occurs when there has been only slight endocarditis, and when there has been no internal inflammation at all. So that we may infer, that the element of embarrassed heart's action is less important in the production of the nervous phenomena than that of an impoverished and poisoned blood.

In the delirium of erysipelas and of typhus fever we have the blood poisoned by the erysipelas or the typhus poison, and impoverished during

the period of incubation of the poison, and in many instances by influences deleterious to health existing prior to the reception of the poison, which, doubtless, rendered the patient a more ready prey to its destructive power. Hence, then, the pathology of these forms of delirium must be regarded as essentially the same as that of the others to which I have referred. And the more depressed the patient is at the time of the introduction of the poison, and the poorer the condition of his blood, the more likely will he be to suffer from delirium.

It will readily occur to any one disposed to object to these views of the pathology of delirium, that the traumatic delirium is not so readily explicable on these principles. What connexion, it will be asked, is there between a compound fracture and a poison in the blood? how can a capital operation in surgery develope a poison in the blood?

I think, however, that it may be affirmed that in cases of severe injuries, fractures, burns, and operations, the elements which, in the forms of delirium we have been considering, contribute to the development of the delirious state, are present. Many of the patients who suffer in this way have been free livers, and have their blood more or less contaminated by gouty or rheumatic, or, in younger subjects, by scrofulous matter. Moreover, the shock of the operation, or other injury, the loss of blood, the confinement consequent upon it, the low diet and antiphlogistic treatment which may have been adopted, enfeeble the heart's action and impoverish the blood. It is well known that traumatic delirium is much more apt to occur in persons who had previously been addicted to habits of intemperance, or in persons of damaged constitution and enfeebled health, than in sound and vigorous subjects.

Pathology of coma.—If these views be admitted respecting the pathology of the principal forms of delirium, there will be no difficulty in determining the true pathology of the corresponding forms of coma, excluding the traumatic variety and that from compression.

We exclude these forms, because their cause is clearly local. In the one case the suspension of the action of the brain is due to the influence of shock on the nervous matter. For a certain time, varying in duration according to the violence of the injury sustained, the vital changes of the brain seem to be suspended; they then recover themselves more or less gradually. A similar phenomenon often occurs in physiological experiments. In pithing a frog, if the operation be done rapidly and roughly the animal remains perfectly motionless for some time, no reflex motion whatever can be excited by any mode of stimulation. The animal lies in this state for a certain time, when its reflex actions return, the paralysing influence of the shock caused by the division of the spinal cord having passed away.

Again, in the coma from a depressed fracture of the skull, or from an effusion of blood or serum, the cause is clearly local, as is shown by the rapidity with which it passes off when a surgical operation has been successful in elevating the depressed and compressing bone, and by the incurability of the cases where a large intercranial hemorrhage is the compressing cause.

But in all the other varieties of coma the close analogy of the clinical history points to a close analogy of cause and of pathology: and this is

clearly shown in the toxic delirium and coma. A poisonous agent capable of exciting delirium, when administered to a certain extent, will produce coma, if given in a larger dose; and it may be stated that *all* the poisons capable of producing delirium will also cause coma. Take, for example, chloroform: in the early stages of its administration we have delirium; in the later, when more chloroform has been given, coma: so, also, alcohol; so, likewise, opium, stramonium; and the same remark applies to all those agents which exercise a direct action on the brain.

Coma, then, is a higher degree of poisoning than delirium. In the latter case the poison simply irritates, deranges the nutrition of the brain, so as to cause an abnormal and irregular mode of action of that organ. In the former case it paralyses.

If, now, we admit the humoral nature of the epileptic and hysteric paroxysms, and that the epileptic and hysteric forms of delirium are the result of a disturbed nutrition of the brain by some poisonous matter in the blood, it is clearly highly reasonable to view these forms of coma as but higher degrees of disturbed nutrition from a larger dose or a greater virulence of the poison.

And this reasoning so obviously applies to the rheumatic and gouty coma, that it would be quite superfluous to occupy time with further remarks upon them.

Only admit the humoral view of the various forms of delirium, which I have described, and the explanation of the corresponding varieties of coma follows as a matter of course.

And I must here observe, in concluding my remarks upon the pathology of delirium and coma, that, so far as I know, no explanation has as yet been given of them, so comprehensive and so accordant with the striking analogies in the clinical history of the various forms of those affections as this, which I may designate the humoral view of the pathology of delirium and coma.

On the Treatment.—I had hoped to have been able to have reviewed the various modes of treatment proposed or adopted for these affections: but the limited space of time allotted to these lectures compels me to confine myself to a very brief reference to one or two important points.

And, first, I would remark that the facts which I have elicited as to the non-inflammatory nature of infinitely the greatest number of cases of delirium and coma, denote how unnecessary is the antiphlogistic treatment in most of them, and how mischievous it may be in most of them.

And, as to the employment of general or local blood-letting, it is a practice not to be justified by anything in the clinical history or the morbid anatomy of these affections, unless perhaps in the truly inflammatory forms, or where some inflammatory complication may exist. I would here remark, that bleeding tends to the production of that state of blood which is favourable to the development of the comatose or delirious states. It has long been recognised by various observations upon the quantitative analysis of the blood, that bleeding tends to increase the water, to diminish the specific gravity of the serum, and to diminish in a very marked manner the amount of the coloured corpuscles,—to induce, in fact, a state of blood highly favourable to the exosmose of its fluid parts among the tissues, and which is apt to produce

a special variety of delirium and coma (the anæmic), and which, it is reasonable to conclude, would be very apt to increase the intensity of other forms of delirium and coma.

I was anxious to ascertain the effect of repeated bleedings upon the blood in a case where food had been at the same time freely given; and accordingly I tried the following experiments, with the kind and able assistance of my friend Mr. Lionel Beale. A large and well-nourished dog, apparently in perfectly good health, was fed daily on two pounds of meat and a quart of milk. He was bled on four successive days to the extent of six ounces each day, and the blood carefully analysed. The blood drawn in the first bleeding on the 6th of April contained, in a thousand parts, 142·85 corpuscles, 2·42 fibrin, and 783.79 water. That taken by the second bleeding (on the 7th April) exhibited a diminution of the corpuscles to 113·54, and an increase of the water to 810·89, and of the fibrin to 4·72. On the third bleeding (April 8th) the corpuscles had fallen to 110·58, and the water had increased to 815·18, the fibrin being 4·34. And on the fourth bleeding the corpuscles were 106·96, the water 813·04, and the fibrin 3·99.

Thus, notwithstanding the high feeding, the obvious and marked tendency of the withdrawal of blood from the system is to increase the water and diminish the corpuscles, while the fibrin is evidently not reduced, but rather increased.

So much for bleeding. Generally speaking, however, an antiphlogistic system is inapplicable in delirium and in coma. We have ample confirmation of this in the results of experience in delirium tremens. I believe practical men are now pretty well agreed upon this point. And what applies to delirium tremens applies also to all the forms of delirium. The approach of delirium should be the signal to the practitioner to look to the support of his patient: this is particularly the case in the delirium of rheumatic fever and of gout, and in that of erysipelas and typhus.

I must add one word before I conclude as to the use of opium. In certain forms of delirium, the cautious and watchful use of this drug is of the utmost value; in others it is attended with danger. It appears to me that in those cases of delirium which have a tendency to pass into coma, opium should be avoided, or used with the greatest caution, whereas in the wakeful delirium it is of great value, and may often be employed very freely, not only with impunity, but also with great benefit. In the epileptic and hysterical delirium, and in that from gout, opium, if used at all, must be employed with great caution. On the other hand, in the delirium of rheumatic fever, and in that of anæmia, in the traumatic delirium, and in delirium tremens, it is invaluable, of course with certain restrictions.

I regret that the time allotted to these lectures obliges me to conclude here my rapid survey of the pathology and treatment of delirium and coma. Much more might be added to what I have said, especially as regards the treatment; but I shall be content if I have succeeded in calling the attention of the profession more particularly to the intrinsic nature of these affections,—a subject which does not appear to me to have received from them all the attention which their importance deserves.—*Med. Gazette, May* 31, 1850, *p.* 921.

188.—ON THE DISEASES OF THE ARTICULAR CARTILAGES.

By Dr. P. REDFERN, Lecturer of Anatomy, &c., Aberdeen.

Before treating of disease in articular cartilages, it is necessary to notice their position amongst the tissues, and their mechanical and vital properties in the healthy state. They are formed of a texture, which, in the purest state in which we see it, consists of a mass of nucleated cells, similar in every respect to those of the cellular textures in plants. Other forms of cartilage have their cells spread out in a granular or fibrous mass, called the hyaline or inter-cellular substance of cartilage. The cells, in every form, are capable of producing others, so that, whilst the old cells are constantly disappearing, others are growing to supply their places; and thus the tissue is continually undergoing important nutritive changes, by which its functions are preserved to the latest periods of existence. Its powers of absorption are very great, and there can be little doubt that, by these, articular cartilages receive a sufficient amount of nutritive material from the blood which circulates in the vessels of the bone or synovial membrane.

In the 'Philosophical Transactions' for 1841, Mr. Toynbee pointed out that the blood-vessels of the bone, near a cartilaginous surface, present certain convolutions, dilatations, plexuses, and other peculiarities, well adapted for the reception of blood, from which the liquor sanguinis may be separated by exudation, for the purpose of nourishing the cartilage. He showed, also, that these vessels are separated from the cartilage by "a lamella of bone, composed of two sets of osseous layers; the one, dense and thick, is continuous with the vertical fibres of the cancelli; the other, delicate and thin, principally composed of osseous corpuscles, is situated at right angles to the latter, and fills up the interspaces of the vertical fibres". Mr. T. believes the articular cartilage is chiefly nourished by exudations from the above-named blood-vessels, the arrangement of which, with the absence of any other means of nutrition, have led him to this conclusion. He points to the existence of a number of osseous lacunæ, without other openings or canals, in the articular lamella of the bones; and to a series of minute canals, situated in the deeper parts of the cartilage, and leading towards the free surface, as means whereby the passage of nutritious fluid from the blood-vessels of the bone into the substance of the cartilage may be facilitated. In the fibro-cartilages, Mr. T. states, that the blood-vessels uniformly terminate within the boundaries of the fibrous tissue, without passing into the part formed of cartilage. He regards the fibrous portion of fibro-cartilage as formed from the cells of the cartilaginous part, having found that, in the fœtus of three and seven months, the external part of the inter-vertebral substance contains cells elongating into fibres, whilst up to adult age, the changes in it consist in the encroachment of the fibrous portion upon the cartilaginous. It may be noticed here, that Mr. T. also maintains that, during the whole of life, articular cartilages gradually become thinner by being converted into bone.

Dr. Leidy has different views regarding the structure and mode of nutrition of articular cartilages. He describes the cartilage corpuscles as solid nucleolo-nucleated cells lying in groups. The contents of the cells are a translucent, homogenous, or minutely granular substance,

with a central mass of distinctly coarser and darker granules, in which a transparent, round, or oval nucleus can be seen, coloured brown by the application of tincture of iodine. He has described and figured the cartilage matrix, as a substance made up of filaments 1-25,000th of an inch in diameter, composed of a single row of granules. These filaments are arranged horizontally at the free surface, but vertically in the deeper parts of the tissue. To this arrangement of the filaments, he attributes the horizontal and vertical arrangement of the cells, which, he says, in being developed amongst fibres, will necessarily extend in the direction in which there is least resistance, in the line of direction of the filaments, —and also the direction taken by fractures in different parts of the thickness of the cartilage. He regards the intra-cellular substance as originating in the exercise of the vital activity of the cells, which accumulate and fix around and within themselves certain matters which they derive from the surrounding nutritive fluids, as happens in the case of many zooid plants,—the cells themselves multiplying by division into masses which ultimately become cells like the former. Dr. L. believes articular cartilage to be nourished by fluids poured out from the blood on its attached surface, and by the *circulus vasculosus* at its circumference, but especially by the synovial fluid, which is rich in albumen, the substance from which he regards it as certain that the tissue of cartilage is formed. Henle noticed the probability of the occurrence of this third mode of nutrition many years ago, but it is difficult to conceive that the synovial fluid should serve the purpose of nourishing the tissue, the free surface of which, there can be no doubt, it is intended to lubricate. Again, the synovial fluid is deficient in potash, magnesia, and sulphuric acid, which are found in cartilages; and, moreover, the costal and many other cartilages are certainly not nourished by it. The filamentary arrangement of the molecules of the healthy inter-cellular substance is important, as it is shown, by the preceding observations, that, in the most frequent changes to which articular cartilages are liable under the influence of increased or anormal nutrition, the hyaline substance on the surface splits into bands and fibres parallel to it; whilst, in the deeper parts, these are always arranged more or less vertically.

It was noticed by Mandl that the nuclei of fibro-cartilages more frequently contain fatty matter than those of true cartilages; and Henle remarks that whenever fibres become developed in the inter-cellular substance of certain cartilages, the nuclei of their cells become converted, in great part, into fat, as if the two processes were connected with each other, whilst the cytoblasts never contain fat in those cartilages which do not become fibrous. The latter author also adds, that whilst fibres are frequently found in advanced life, in those cartilages which have a tendency to ossify, he has never seen a trace of fibre in those which do not ossify, as the articular cartilages and those of the nose.

So far as I am aware, the actual conversion of the hyaline substance of articular cartilage into fibres, in disease, has not been previously demonstrated, though the external appearance of such cartilages is sufficient to lead to a suspicion of its occurrence. In many of the states of disease which have been described in the preceding observations, the fusion of the walls of the old cells with the intercellular substance, and the division of the gelatinous cell-contents into as many pieces as there

are corpuscles or nuclei in the interior, were seen to take place much more evidently than they ever are in the healthy state, proving that this is one very important mode in which new cells are formed and the old ones removed from the tissue.

The most important uses of articular cartilages are mechanical. They constitute a beautifully smooth and highly elastic covering for the ends of the bones, thus facilitating motion, and decomposing a large portion of the forces which would have produced repeated fractures, had they been applied directly to the bones. But, as these textures are subjected to great friction, they would wear away gradually, but for the constancy of their nutritive changes, which are sufficient to prevent this, as is shown in the fact that the cartilages are not thinner in individuals, or in particular limbs that are almost unceasingly employed, than in others, and that, though the cartilages are a little thinner in old than in young persons, the difference has never been shown to result from friction, nor to exceed in amount similar changes known to take place in other textures as age advances. Again, the elasticity of most, if not of all substances, is impaired by constant use, in which we see an additional necessity for the constantly recurring changes in articular cartilages. The fact being certain, that important nutritive changes do constantly take place in these textures, it is surely inconsistent with true pathology to conclude that they are not likewise subject to anormal nutritive changes, similar to those from which all other textures are known to suffer. And yet, the argument can have no weight without the support of numerous and well-ascertained facts.

Mr. Birkett, following out Richet's view, has endeavoured to show that bone and cartilage in their relations to each other are similar to true skin and cuticle. To prove this, however, appears to me to require some explanation—why the cells of cartilage should so readily produce others, when no single epithelial cell can perform a similar function;—why articular cartilage is never reproduced, whilst cuticle and epithelium are replaced more readily than any other tissues in the body;—why, when there is a very obvious chemical difference in the deep and superficial layers of cuticle, no such difference can be shown in the parts of articular cartilage;—and why the deep cells of cartilage are arranged in perpendicular columns, and the superficial ones horizontally to the surface, if they merely constitute a simple epithelial layer.

It is important to notice that no nerves enter into cartilages, and that nothing is known of their existence in fibro-cartilages, in which we might have expected to have found them, in connection with the fibres. Such structures are not sensitive, as has been shown by numerous observations and experiments, and yet it is generally believed that, in disease, they cause such acute pain as exhausts the patient.

Morbid anatomy.—Hypertrophy, or an actual increase in the substance of the cartilage, occurs occasionally, without any obvious change in the texture, though it is generally accompanied with a soft, spongy, and decidedly diseased condition.

Softening is generally very evident to the naked eye. The texture of the part so diseased is pulpy, and resembles a portion of soft fibro-cartilage. For microscopic examination, sections are difficult to be obtained,

and the part requires slight separation with needles,—the hyaline substance is dark and indistinctly granular or fibrous,—the cells are enlarged, and contain a number of other cells or nuclei;—in many parts, the dark fibrous mass contains corpuscles or small cells, which appear to have been set free by the bursting of larger ones.

Atrophy is seen in old people, in whom it is found affecting a whole surface or particular parts. If affecting particular parts, there are generally traces of the former existence of other disease; but when it is thinner than usual over the whole surface, its structure appears healthy.

Ulceration is found involving whole surfaces, the cartilage being soft, velvety, and abraded; more frequently, such changes are found in the central parts of the cartilages alone, the circumferential part being white, dense, and generally split by numerous small fissures;—or a small spot of the size of a split pea may be the only part affected, and may present an irregularly rounded and excavated spot, the margins of which are fringed by a multitude of projecting bands and fibres, the deepest part being also covered with similar processes. Again, limited depressions occasionally exist, and appear as smooth as if portions of cartilage had been scooped out: —in more active forms of disease, the cartilage is removed very rapidly, and, on examination, a few patches here and there may be the only traces of its former existence. Such patches are generally reddened;—their surface, though not perfectly smooth, may yet be glistening, and their general appearance is often such as might lead to the impression, that they are portions of tolerably healthy cartilage, which have been left after the absorption of the other parts. The whole surfaces entering into the formation of a joint, or particular parts of the same, are not unfrequently found covered with fibrous and projecting fringes in advanced life. These are best seen on immersing the surface in water, when the fibrous processes float out, and may be carefully examined. They are of all sizes and lengths, attached at one end to the surface of the cartilage, and free at the other. They are found most frequently on the cartilages of the patella and trochlear surface of the femur, the substance of these cartilages, at the same time, being apparently healthy, as far as can be ascertained by the naked eye.

The process thus spoken of as ulceration may commence at any part of the cartilage,—on either of its surfaces, or in its very substance, though its favourite seat is the free surface, from which it gradually extends to the deeper parts, destroying them as it meets with them, and at last, leaving the bone completely bare.

Whatever external appearance the disease presents, the structural changes are found to be similar, in all cases, on a microscopic examination. These consist of changes in the structure and arrangement of the cells, and of others in the hyaline or inter-cellular substance. In very active forms of disease, the changes in the inter-cellular substance are little observed, owing to its rapid disintegration, or to its absorption into the cells; whilst, in chronic cases, the splitting of the hyaline substance gives to the surface a character so peculiar and well-marked, that, after repeated microscopic examinations, it is possible to state, on a simple inspection, what changes the structure will be found to have undergone, when more minutely examined.

The first changes which can be noticed in the cells are their enlarge-

ment and irregular arrangement in the tissue. Some of the cells under the writer's observation were found to measure 1-100th of an inch in their long diameter, and others were five or six times their usual size, over large portions of many diseased surfaces. They become rounded, oval, or oblong, and very generally isolated and irregularly distributed, instead of being elongated and found in groups which form columns in the deeper parts. If only slightly enlarged, their nuclei remain in small number, and are irregular;—if considerably enlarged, their contents differ entirely from those of healthy cells, and consist of a mass of corpuscles, which are irregularly rounded, oblong, or triangular, glistening on the surface, and varying in diameter from 1-2000th to 1-5000th of an inch, the larger ones being finely granular, or containing a small nucleolus. On tracing sections, containing such cells, towards the surface or diseased part, the cell-walls become indistinct,—patches of corpuscles are met with without cell-walls enclosing them, and the corpuscles are found at length freely mixed with the tissue. These changes are best marked in the deep cells, though they occur also in the superficial ones. The cells of the free surface enlarge and become much further separated from each other, losing their regularity of arrangement. Their nuclei generally disappear, and the whole cell often becomes finely granular, and is reduced to a mere shred of membrane, which is gradually lost. In some places the diseased cells enclose others, of about 1-1400th of an inch in diameter, which are shortly released by the bursting of the containing cells. These smaller cells are full of dark and irregular granules, 1-15,000th to 1-5000th of an inch in diameter. They are often found mixed with fibrous tissue, to which they give a dark and indistinct character, as they become gradually lost amongst its fibres. The diseased cells, nuclei, or corpuscles, contain granules under many other circumstances. Indeed, the granules appear of all intermediate sizes up to 1-2000th of an inch, when they are evidently formed of drops of oil, into which the nuclei have probably been converted.

When the disease advances with great rapidity, scarcely any changes can be seen but those in the cells. These become rapidly distended, their nuclei are converted into granules, and the cells afterwards form a number of cavities in the tissue, the walls of which appear finely mottled —or the cells burst upon the surface, causing it to present a series of cavities; and, having discharged their contents, these enter into the formation of a fibro-nucleated membrane, with nipple-like processes which fill up the opened cells.

The alterations in the hyaline substance consist of a splitting into bands and fibres of all sizes, the smallest fibres being indistinguishable from those of white fibrous tissue. The bands constitute the processes projecting into the joint, loose at one end, and attached to the cartilage at the other. This change was noticed in all the preceding observations. It is not so often seen in acute as in chronic cases, probably, because, in the former, the rapid enlargement of the cells destroys the hyaline substance before it has time to break up into bands and fibres; whilst, in the chronic disease, the structure is not always wholly removed, but converted into the fibrous membrane which covers the bone when ulcers have healed. Wherever the surface presents the velvety appearance, this is found to be due to the splitting of the hyaline substance into fibres

and bands. Amongst these, rounded gelatinous masses are at times found, and they are occasionally stuck upon the striated bands, and interrupt their continuity. They have every appearance of being the changed contents of cartilage cells. The smaller bands are very transparent, and contain no traces of nuclei or cells,—the larger ones have, within them, all the forms of cells and nuclei, which are found deeper in the texture, the most advanced stages of disease in the cells being always found at the part split into fibres. In the parts wholly converted into small fibres, traces of the nuclei and cells can generally be seen. Where the bands are connected with the cartilage, enlarged cells or cavities are occasionally found in a position which indicates that they are concerned in causing the splitting; and it is to be noticed, that when the hyaline substance of the original surface of the cartilage splits, its bands and fibres lie horizontally, but when that of the deeper parts undergoes a like change, the bands and fibres are always vertical to the surface, the difference being evidently owing to the normal arrangement of the cells of these parts, whether the cells are or are not the immediate cause of the splitting.

The membrane covering the bone at the bottom of old ulcerations which have healed, and that which covers the free surface of cartilages in a chronic state of disease, are of the same character, the latter being only of more recent formation. They consist of dark and very small fibres running horizontally, no nuclei being seen in the parts of old formation until after the action of acetic acid; whilst in other and more recently formed parts, the nuclei are very distinct, and in still more recent ones, there is an indistinctly granular and fibrous mass, full of the corpuscles, discharged by the bursting of cartilage cells, and in various stages of elongation.

As long as the cartilage is the only tissue affected, no other structures are found than those which have been named, and no pus is formed. But, whenever the bone or synovial membrane becomes diseased, these parts throw out the usual exudation, in which new structures grow. Upon the synovial membrane, the exudation becomes organised into lymph or converted into pus, or it may be mixed with tubercular granular matter if it be in a scrofulous individual; in the tissue of the bone, plastic and fusiform cells and primitive filaments are formed in the exuded matters. In all such cases, the new elements just named appear, and have a few changed cartilage cells mixed amongst them.

Disease affecting the articular fibro-cartilages is of a character precisely similar to that before named, whether the changes in the cells or in the fibrous mass be considered.

Chemistry.—During the occurrence of the above-named morphological changes, there are doubtless many important chemical ones. Thus, the fibres formed from the hyaline substance, are at first rendered transparent, and then almost wholly dissolved, by the action of acetic acid, as is the case with white fibrous tissue, which is known to consist of gelatin; but cartilages contain chondrin. Now, when the complete conversion into fibres has not taken place, and granular cells are mixed with indistinct fibres, acetic acid has less effect in producing transparency and solution, the actual chemical composition of the part probably changing in a direct ratio with the changes of structure. Similar chemical and morphological changes are found to advance side by side in the conversion

of fibrin into pyin, and this into gelatin, during the formation of white fibrous tissue from coagulated blood-plasma. The gelatinous masses, stuck upon the bands in some places, and loose in others, are also the changed contents of cartilage cells. In many places, the nuclei of cells appear to be resolved into fat; and it is curious to notice, that, in the greater number of places where granular cells are found, these are of the size of the compound granular or exudation cells found in diseased states of other tissues; and yet they are not newly formed cells, but those of cartilage changed in character. Another well-marked chemical action is shown in the deposition of a number of masses of carbonate of lime in the very substance of the cartilage; and, should it prove that the crystals of oxalate of lime, found on the surface in this case, were formed during life, the mode of production of the oxalic acid will constitute a very interesting and important object of research.

Pathology. –The essential nature of all the known diseases of articular cartilages, is shown by the preceding observations to be a change in the nutrition of their texture. That any one of these is produced mechanically cannot for a moment be maintained, after a careful examination of the texture of the diseased part. Even the fringed and flocculent appearance of cartilages in chronic disease, is always associated with marked changes in the cells and hyaline substance. And yet it is possible, that, in some cases, the greater amount of pressure thrown on one lower extremity than the other, is connected with more extensive disease in the joints of that side. That the disease depends on actions going on in the cartilage, and proper to it, is proved by its frequent occurrence without a vestige of disease in the synovial membrane or bone; and, that all the changes go on independently of any peculiar action in the blood-vessels, is shown by the appearance of the disease on the surface, in by far the greater number of cases, and at parts far removed from the vessels of the bone, or of the synovial or other membrane. Many authors get rid of the "fibrous degeneration of the cartilage," by assigning to it a nature altogether different from that of other processes in the same texture. That it differs thus, is the opinion of Mr. Key, who was the first to maintain that ulceration of articular cartilages results from the absorbing action of a membrane produced on its surface: yet Mr. Key does not hesitate to state boldly, that after inflammation caused by wounds, the cartilage is often found to be extensively destroyed and the bone laid bare, without any appearance of a membrane for the purpose of absorption. Yet it is certain that in many, if not in the majority of cases of ulceration of cartilages, the process commences without the presence of any membrane whatever; whilst, on the other hand, there can be little doubt that cartilages are very frequently covered by a thickened synovial, or a newly-formed vascular membrane, without any ulceration resulting.

That these processes do not *depend* on the conversion of the nuclei and hyaline substance into fat, is shown by such changes being only occasional ones, the whole substance of the cartilage being very frequently destroyed, without the production of fatty granules in a single cell. They can only be referred to an anormal nutrition of the texture, by which the cells become inordinately and imperfectly developed, and the hyaline substance is split into bands and fibres. It will be seen that these state-

ments require to be received as ultimate facts, and that, however inexplicable the nature of the process may appear beyond this, an anormal state of the nutrition of the part, gives us as perfect an explanation of the formation of the diseased textures before named, as healthy nutrition does of the manner in which the texture is preserved in its normal state.

The disease may be acute or chronic. When acute, the changes in the cells are at times the only ones which can be observed, and the whole cartilages of a joint may be removed with extreme rapidity. In two cases, Mr. Mayo saw the articular cartilages of the ankle completely removed within a month after an injury; and after the lapse of two months, in another case, he found that the cartilages had disappeared and that the bones were joined by semi-transparent and organized lymph from 1-6th to 1-4th of an inch in thickness. Mr. Lawrence relates the case of a patient, who died of phlebitis after blood-letting, in which he believes that complete destruction of the articular cartilages of the femur and tibia took place in four days. When the disease is chronic, it may last for years without producing any symptoms whatever; or, it may be the cause of the crackling and grating sometimes noticed in the joints of old people. In some cases I have seen, the patients died of other affections without knowing that disease existed in the joints; and in one case, the nature of the changes were such, as to render it very probable that disease had existed for years, and had been cured, in many places, by the formation of the thin and translucent membrane covering the bone.

Now, if it be true, that disease having the same essential structural characters in all cases, at times goes on to the complete destruction of the texture, without the patient or his attendant being aware of its existence; and, in others, causes such violent pain and hectic irritation in the system as to require amputation, the fact is of extreme importance, as, so far as I know, no similar occurrence takes place in any other texture whatever.

I shall not presume to deny, that uncomplicated disease of articular cartilages produces excessive pain, since this is stated very positively on the high authority of Sir B. Brodie, and by most surgical writers. And yet, on looking over the numerous cases which have been related by Sir B. Brodie and other authors, I find but few which will aid in the determination of the question. Uncomplicated disease of cartilage is of very rare occurrence, if we exclude the cases of fibrous degeneration; and carefully collected reports of numerous cases, with histological examinations, are necessary to establish a fact so decidedly at variance with everything we know of disease and its characters in other textures. This will appear more evident from the following considerations:—

1st. Nerves have never been found in cartilages, and there is not the slightest reason for believing that they contain any, for they give no evidence of sensibility in man or in animals on being exposed or sliced away. The cuticle, enamel, and the substance of the brain, are in a similar position. They contain no nerves, and give no indications of sensibility, when parts are removed, or otherwise destroyed. Moreover, it is well known to every pathologist, that an immense portion of the whole bulk of the cerebrum may be utterly destroyed by disease, without a single recognised symptom or other mark of the existence of the lesion. Hence the value of pain.

2nd. It is certain that disease of cartilages may go on for years, and even be cured by the efforts of nature, without the knowledge of the patient, and that the essential characters of such disease are similar to those of other diseases of the same tissue, which are supposed to be the cause of excessive and exhausting pain.

3rd. The symptoms supposed to indicate disease in the cartilages are so closely allied to those produced by affections of the bones, that a positive diagnosis is very difficult to make until the bone becomes exposed, and then the symptoms are, at least, as easily attributable to the disease in the bone as to that in the cartilage. Indeed, M. Richet, in the work before-named, when entirely ignorant of the real nature of the changes which take place in diseased articular cartilages, gives several good anatomical and other reasons why the symptoms supposed to arise from disease in them should be referred to the bones.

4th. Pus has never been shown to be formed from the substance of diseased articular cartilages, nor from effusions into their texture. At the time when pus is formed in joints, the pain becomes very severe, though there may have been but little previously, the very formation of pus indicating that other textures than the cartilage are affected, and that the pain proceeds from the disease in them.

After ulceration has gone on for a considerable time, the part may be healed without any evident exudation. The structure which is formed, is precisely of the same character as the fibro-nucleated membrane found on the surface of cartilages in a chronic state of disease, and it is probably formed in a similar way to the latter, by such a new arrangement of the particles of the cartilage as converts it into fibrous tissue.

Diagnosis.—Little remains to be said on this head. It has been shown, that in cases of chronic disease affecting every cartilage in both knee-joints, there may not be a single indication of disease. It is generally believed, that ulceration of cartilages is indicated by pains, which are at first slight, and afterwards become excessively severe;—which affect a particular spot, deep in a joint, as well as remote parts of the limb, becoming more severe during the night, and always unattended by swelling for four or five weeks, or even for many months. These pains are always increased by motion of the joint and pressure of the articulating surfaces against each other. At last, the suffering becomes most excruciating, and is accompanied by painful spasms and startings of the limb during sleep; the patient's health and spirits fail, and amputation alone can save his life. Sir B. Brodie lays great stress on the character of the pains, and the exhaustion produced by them; on their gradual increase in intensity, and on the occurrence of pains in remote parts of the limb; —on the absence of swelling for a long time, and then on its peculiar character. But the symptoms of disease existing in the bone are so nearly similar, that it is doubtful if all the characters taken together will enable an accomplished surgeon to distinguish the two. It is not at all surprising that, when ulceration has laid the bone bare at a particular part, the symptoms should be so much aggravated, and pus formed, for this is just what we should expect from disease in the bone.

Treatment.— Without a correct diagnosis, the treatment must be empirical, to a certain extent; and directed to the relief of particular

symptoms. All the diseases of cartilages result from a local or general disorder of the nutritive processes:—in the former case, there may be no indications of disease; and in the latter, the bone and synovial membrane are either implicated from the first, or become so subsequently, and the treatment must vary accordingly. Sir B. Brodie places great reliance on caustic issues, and states that they are of greater service in cases where the cartilages are ulcerated than in other diseases of the joints. When the disease is of a scrofulous or tubercular character, there can be no doubt that more benefit is to expected from constitutional than from local treatment. For all such cases, the ol. jecoris aselli is especially indicated, and local counter-irritation should be used at the same time, at a greater or less distance from the joint, according to the activity of the disease. It is very obvious that, whenever the cartilages of a joint have lost their smooth surfaces, perfect rest is essential for a cure; and it should be secured by bandaging, according to Mr. Scott's plan, or by splints, &c. This is equally essential when anchylosis is expected; for nothing can be conceived so likely to produce destructive irritation as the moving of two roughened and highly sensitive surfaces of bone upon each other; nor is anything so likely to prevent the organization of the lymph, which may be expected to be poured out in this stage of the disease.

Finally. I may state the following as the conclusions, which appear to be warrantable from the foregoing considerations:—

1st. That the whole of the known forms of disease in articular cartilages are connected with changes in the texture, which are essentially similar to each other.

2nd. That during the progress of these changes, the cells of the cartilage become enlarged, rounded, and filled with corpuscles, in lieu of healthy cells; bursting subsequently, and discharging their contents into the texture on the surface; whilst the hyaline substance splits into bands and fibres, the changed hyaline substance and the discharged corpuscles of the cells, afterwards forming, in many cases, a fibro-nucleated membrane on the surface of the diseased cartilage.

3rd. That these changes are alone referable to an anormal nutrition as their immediate cause, and, in no case, to mechanical or chemical actions, such as attrition or digestion in a diseased secretion.

4th. The most extensive disease may be going on in many joints at the same time, and may proceed to destroy the whole thickness of the cartilage in particular parts, without the patient's knowledge, and whilst he is engaged in an active occupation.

5th. That the disease commences most frequently upon the free surface; but it may proceed from the bone to affect the attached surface, or it may take place in the middle of the thickness of the cartilage.

6th. That it is, at least, very doubtful if the symptoms which are believed to indicate the existence of ulceration of articular cartilages, are not really dependent on a morbid change in the bone.

7th. That disease of the whole thickness of an articular cartilage, at particular parts, admits of a natural cure, by the formation of a fibro-nucleated membrane from the substance of the cartilage, without the occurrence of any new exudation.—*Monthly Journal, Dec.* 1849, *p.* 1275.

A SYNOPSIS,

CONTAINING

A SHORT ABSTRACT OF THE MOST PRACTICAL ARTICLES IN THE FOREGOING PAGES OF THIS VOLUME; AND SHOWING, AT A GLANCE, THE MOST IMPORTANT INDICATIONS OF TREATMENT PUBLISHED BY DIFFERENT WRITERS WITHIN THE LAST HALF-YEAR. (ARRANGED ALPHABETICALLY.)

DISEASES AFFECTING THE SYSTEM GENERALLY.

ANÆMIA.—Give a grain or two of tannin, twice or three times a-day, dissolved in water or any simple vehicle, flavoured with syrup to conceal the taste. The use of tannin does not prevent the employment of other remedies, such as iron, cod-liver oil, &c., but rather promotes their efficacy. (Dr. S. Scott Alison, p. 385.)

CANCER.—When cauterization is employed, it is recommended to perform it thus: A gelatinous paste having been procured by dropping highly concentrated nitric acid upon lint, a portion of this, of an appropriate size is placed upon the part, and allowed to remain for fifteen or twenty minutes; it is then removed, and the part dressed with lint dipped in a solution of alum. The cauterization is to be repeated daily, first removing the eschar previously made. (Dr. Rivallié, p. 10.)

DROPSY.—*Ascites.*—When there are no inflammatory symptoms, and the legs have not become œdematous, methodical compression may be used with the greatest advantage; and it will often be found that diuretics, though previously given in vain, will act beneficially as soon as the employment of compression is adopted.

When considerable ascites occurs with general dropsy, from a watery condition of the blood, and there are no evidences of inflammatory action, give small doses of sulphate of iron with sulphuric acid. It will both act as an unstimulating diuretic, and improve the condition of the blood. (Dr. Dubini, p. 20.)

FEVER.—*Typhus.*—"The approach of delirium should be the signal to the practitioner to look to the support of his patient." (Dr. Todd, p. 446.)

Intermittent.—The best and cheapest way of giving quinine, is by administering a single ten-grain dose (made into four pills with extract of millefolium) on a day free of fever. (Dr. Pfeufer, p. 24.)

RHEUMATISM, *Acute.*—Let the approach of delirium be an indication for the adoption of measures to support the strength. (Dr. Todd, p. 446.)

Gonorrhœal.—It is very difficult to cure. Give calomel and opium; also iodide of potassium, or liquor potassæ, with remedies adapted to give tone to the stomach. If the patient was taking copaiba, let it be omitted. (Mr. B. Cooper, p. 215.)

Rickets.—In diseases arising from insufficiency of earthy phosphates in the food, give calcined bones in powder; and when there is too rapid elimination of phosphates by the urine, combine with the calcined bones a large proportion of sugar, or add the latter to the food. The sugar will diminish the activity of the nutritive changes which take place in the tissues, and so lessen the amount of matter excreted. But "when a child at the breast is affected with this disease, owing to the poverty of the milk, the mother should take the calcined bones, but without the sugar, in order that the elimination of the phosphates through the milk may not be interfered with." (Dr. Bocker, p. 162.)

Give tannic acid in doses of half a grain or a grain, night and morning, in sweetened water or any simple vehicle, and continue its use for a long time. It acts, in all probability, rather as a tonic and "histogenetic", than by arresting the excretion of lime by an astringent action on the kidney. (Dr. S. Scott Alison, p. 385.)

The indications are, not to cram the patients with preparations of earthy salts, for these are not deficient in the blood,—but to correct disorder of the digestive system, and to invigorate the body by light nutritious diet, fresh air, cold ablutions, and the use of some medicinal tonic, such as quinine or iron. In some cases steel supports are proper. (Mr. G. M. Humphry, p. 208.)

Scarlatina.—Use frequent sponging with tepid vinegar and water, especially in the early stages, when the skin is hot and the pulse accelerated. This measure is very efficacious in preventing the spread of the disease. (Dr. J. Webster, p. 412.)

Scrofula.—Scrofula may arise not merely from deficient nutrition, owing to bad food, &c., but also from "hyper-activity in the nutritive and destructive changes". In the latter case, which may be known by observing the increased amount of excretory products, give a large proportion of sugar with the patients's usual food; sugar having the property of lessening the activity of these changes, and diminishing the amount of excreted products. (Dr. Bocker, p. 161.)

Scurvy.—It would appear from experiments made on board convict ships, that the remedial powers of citric acid and lime juice, in scurvy, are about on a par; and that the good effects of both of them are probably increased by the addition of sugar. As a prophylactic, citric acid has not been fairly tried, but lime-juice with sugar is unquestionably of the greatest advantage. Nitrate of potash would appear not to possess antiscorbutic properties, and not to be adapted either for a prophylactic or a curative agent. (Dr. A. Bryson, R.N., p. 23.)

Suspended Animation.—[An interesting case in which recovery took place after artificial respiration had been kept up for five hours and a half, is related by Mr. T. Small, p. 424.]

AFFECTIONS OF THE NERVOUS SYSTEM.

CHOREA.—Give prussiate of iron (ferro-sesquicyanide of iron?) in the following manner:—Take of prussiate of iron, grs. xv.; extract of valerian, grs. xlv.; make it into twenty-four pills. Give one pill three times a day, to be followed by a wine glassful of infusion of valerian. (M. Faivre d'Esnans, p. 100.)

DELIRIUM.—In almost every form of delirium, antiphlogistic measures are unnecessary, or even injurious; and the occurrence of delirium in almost any disease, but especially in rheumatism or gout, erysipelas, or typhus, should be considered an indication that it is necessary to support the strength. With regard to the use of opium,—it should be avoided, or used with the greatest caution, in those cases where the delirium has a tendency to pass into coma, as in epileptic or hysterical delirium, and that from gout: but in wakeful delirium, such as the rheumatic, anæmic, and traumatic varieties, and delirium tremens, it may be given freely with great advantage. (Dr. R. B. Todd, p. 446.)

DELIRIUM TREMENS.—Do not attempt to cure the disease by merely giving heroic doses of opium; but be guided in each case by close observation of particular symptoms. Usually there will be found to be three indications:—viz. 1. To allay the excited nervous sensibility, by reducing vascular action, and by freeing the system from all irritating diseased secretions. For this purpose keep the patient at rest in a partially darkened room, and let him be attended by a judicious nurse. Apply ice to the head, or the cold douche three or four times a day; give tartarized antimony with laudanum and nitrous ether. If there is much biliary derangement, give an emetic; or, give large doses of calomel, with antimonials and opium, followed by castor oil, or stimulating enemata. In very rare cases, where there is much vascular excitement, local or general bleeding may be cautiously employed. 2. To support the strength by the administration of nourishment, with a moderate allowance of alcoholic stimulants, greater or less, according to the degree of exhaustion of the patient. 3. To remove poisonous elements from the blood by restoring the excretory function of the liver and kidneys. This will be partly accomplished by the means mentioned under the first head; but is also to be aimed at specially, by the free administration of calomel and diuretics. (Dr. James Bird, p. 57.)

EPILEPSY.—Belladonna is very useful in cases where the attacks occur frequently. The dose of the aqueous extract should be at first about a grain and a half, in divided doses; and this may be increased to about three grains daily. (M. Debreyne, p. 76.)

HYSTERIA.—Marked benefit is derived from belladonna, given as follows:—Take of camphor, 12 grammes (about ʒiij. and gr. v.); assafœtida, 12 grammes; extract of belladonna, 4 grammes (about ʒi.); aqueous extract of opium, 1 gramme (about gr. xvss.); syrup of gum, enough to make 120 pills. Give one pill the first day, two on the second, and gradually increase the dose to six pills daily. (M. Debreyne, p. 77.)

MENINGITIS, *Tubercular.*—When there have been no previous symptoms indicative of a tubercular diathesis, bleeding must be employed, and calomel given. The latter is chiefly to be relied on; but we must not salivate unnecessarily. Cold affusion will be found useful, sometimes availing to arouse the child after the supervention of complete coma. But in the comatose condition, friction of the scalp with tartar emetic ointment, repeated every two hours till pustulation is established, will be of the greatest value. When symptoms denoting general tubercular cachexia precede the cerebral affection, blood-letting, except locally and sparingly, is contra-indicated, and calomel cannot be pushed to the same extent. But the counter-irritation may be employed as in the previous case. (Dr. Hahn, p. 71.)

By judicious management blood-letting may be almost dispensed with, in this, as in most other diseases of infancy. Its effects may be obtained by the use of the warm bath, antimonials, and diuretics, the latter medicines having a very striking antiphlogistic effect: purgatives would serve the same end, but they cannot, except enemata, be safely used in many diseases of children. In the more advanced stages, "calomel for the removal of lymph, and iodine (liq. potassa iodidi comp.) for the absorption of effused fluid, are well-known and trustworthy remedies."

It is very difficult in the cerebral affections of childhood, to distinguish cases which require antiphlogistic treatment from those requiring stimulants. The occurrence of febrile disturbance will generally show that active treatment is required; but if the fever is intermittent, leaving the patient depressed in the intervals, we must be very cautious how we use lowering measures. (Dr. E. Copeman, p. 73.)

NEURALGIA.—It is of the first importance to pay attention to the state of the digestive organs. Cases apparently most severe and intractable, have yielded almost immediately to the employment of gentle laxatives, such as magnesia with soda and hydrarg. c. cretâ, magnesia with jalap, soda, and a little calomel, or magnesia alone; together with small doses of quinine or bebeerine. (Dr. J. Stark, p. 81.)

Facial.—Use the following ointment:—Extract of belladonna, lard, of each twelve parts, opium, two parts; mix accurately. Let a piece the size of a hazel-nut be rubbed in over the seat of pain for five or six minutes, or until it is perfectly absorbed, three times a day. (M. Debreyne, p. 77.)

Accompanying Herpes Zoster.—Apply a blister near or over the affected part; and when the blistered surface has healed, apply a belladonna plaster. (Mr. E. Humpage, p. 78.)

Give grain doses of oxide of silver, combined with compound galbanum pill and extract of hyoscyamus; and use a liniment containing tincture of arnica montana, tincture of opium, and soap liniment. (Dr. S. Palmer, p. 78.)

PARALYSIS.—When electricity is employed, begin with a very weak current. Use the interrupted current from the electro-magnetic machine,

and after every twenty or thirty shocks, at the most, let the patient have a few moment's repose. Perseverance in the employment of the electricity for a considerable time is essential to success. (M. Matteucci, p. 84.)

Hysterical.—After the general health has been improved by tonics and alteratives, employ galvanism. The *secondary* current is the one which has been employed by the author. (Mr. Balman, p. 89.)

TETANUS.—To prevent spasm of the respiratory muscles, it is recommended that the patient should be instructed to respire voluntarily in a measured time, taking as deep inspirations as possible. In order to assist the patient, an assistant should beat time. The patient should be encouraged to persevere in this manner until he falls asleep; and on his waking the same plan should be resumed. (M. Cruveilhier, p. 99.)

Pass a current (the *direct* current), of galvanism through the tetanized limbs. The effect of this, if sufficiently long continued, produces a state of the muscles allied to paralysis. (M. Matteucci, p. 85.)

[A case of idiopathic tetanus successfully treated by galvanism, applied in the form of shocks from an electro-magnetic apparatus, along the spine, over the masseter muscles, and in the course of the great sciatic nerves, is related by Mr. H. Hailey, p. 93.]

Traumatic.—Another case of recovery from traumatic tetanus is reported, in which the inhalation of ether was employed twice a-day. In addition to the etherization, however, the patient was brought under the influence of mercury, strong purgatives were given occasionally, and a belladonna plaster was applied down the spine. (Mr. G. H. Smith, p. 97.)

[A case of traumatic tetanus in which chloroform was used *without* success, is related by Mr. Solly, p. 95.]

AFFECTIONS OF THE RESPIRATORY ORGANS.

BRONCHOCELE.—A case is recorded which was successfully treated by electro-acupuncture. The number of plates used was from sixteen to twenty, and upon the intervening discs of cloth dipped in an acid or saline solution, a little tincture of iodine was dropped. (Dr. Terzi, p. 88.)

CATARRH, *Chronic.*—In old and weakly people, where there is much expectoration, and when there is no disease of the heart or great vessels, give tannin, one, two, or three grains, twice or thrice a-day. (Dr. S. Scott Alison, p. 383.)

CROUP.—Give calomel and alum. To a child seven years old, two grains of calomel and three grains of alum may be given alternately, every hour. (M. Miguel, p. 150.)

When the disease commences as diphtherite in the pharynx, mercury alone is useless, and may indeed be dispensed with, as the local treatment is the most important. The best way is to begin with an emetic of sulphate of copper; then to cauterize the back of the throat well with fuming hydrochloric acid, daily; and to give alum mixed up with honey, every quarter or half an hour. (M. Trousseau, p. 150.)

Epistaxis.—Oil of turpentine will be found an excellent astringent, given in doses of from twenty to sixty minims every three or four hours. Tincture of muriate of iron may be given as an adjunct, or not, according to circumstances. (Dr. T. Smith, p. 125.)

[A new mode of plugging the nostrils by introducing a caoutchouc tube and insufflating it, is mentioned at p. 423.]

Hæmoptysis.—Give oil of turpentine, in doses of from twenty to sixty minims every three or four hours, either simply in water, or combined with infusion of matico. (Dr. T. Smith. p. 125.)

Hiccough.—Preparations of dilute sulphuric acid will be found to act beneficially with great promptitude, in the most obstinate cases. (Dr. Schneider, p. 427.)

Hooping-Cough.—Apply solution of nitrate of silver to the glottis and the interior of the larynx, every other day, by means of a bit of sponge firmly sewed on the end of a whalebone rod, shaped nearly like a male catheter. The solution should be, on the average, gr. xv. to the ounce of distilled water, but in some cases the strength may be increased to ℈ij. in the ounce. The only additional treatment requisite, is to attend to the diet, to regulate the bowels, and to confine the patient to a warm and well-ventilated room, until the stage of hooping is past; and then, if necessary, to give cod-liver oil, or some other tonic, and to recommend change of air. (Dr. E. Watson, p. 151.) (Dr. Hislop, p. 154.)

Nostrils, *Foreign Bodies in the.*—It is recommended to close the nostril which is free, and then to blow forcibly into the patient's mouth. By this means the foreign body will often be discharged. (Dr. Homans, p. 227.)

Paracentesis Thoracis.—[An apparatus by means of which the performance of this operation is much facilitated, is described by Dr. G. F. Easton, p. 228.]

Phthisis Pulmonalis.—In the management of persons born with hereditary tendency to phthisis, it is of the greatest importance while adopting proper hygienic treatment for the body, to keep the mind employed in some manner suitable to the tastes and capacity of the individual. Cheerful recreations should be provided, and the powers of neither mind nor body overtasked; but mere amusement will not supply the beneficial influence which is exerted upon the system by active employment of the mental faculties. (Dr. J. F. Duncan, p. 144.)

In any stage of this disease, but especially in the third, when there are cavities, give tannic acid. The dose may be one, two, or three grains, twice or thrice a-day, dissolved in water or any simple vehicle, flavoured with syrup, which will cover the taste. If there is much sweating, add a little dilute nitric acid. Tannin may be given at the same time as iron, cod-liver oil, or any such means. (Dr. S. Scott Alison, p. 383.)

Faulty nutrition is the first element in the production of the disease; and this faultiness consists in an inability of transforming the carbonaceous constituents of vegetable food into fat, or of acting upon the fatty matters introduced into the system so as to render them easily assimilable. The first indication of treatment, then, is to cause a large amount of fatty matter to be assimilated, by giving food rich in fat. In most cases, however, the powers of the stomach and alimentary canal are much enfeebled, and unable to separate this fat from the food. It therefore becomes necessary to give the animal oils themselves, which will readily enter the system, and become assimilated: and this is the rationale of the good effects of cod-liver oil, which can be digested when no other kind of animal food can be taken in sufficient quantity to furnish the requisite amount of fat. The ordinary dose of cod-liver oil should be a tablespoonful thrice a day, but it may be advantageously increased to four, five, or even six. The kind of oil is of no importance except as regards the palate. (Dr. J. Hughes Bennett, p. 140.)

[We are cautioned to take care that the use of cod-liver oil do not cause congestion of the lungs, and so predispose to pneumonia,— by Dr. Benson, p. 420.]

AFFECTIONS OF THE DIGESTIVE ORGANS.

Anus, *Imperforate.*—If it could be ascertained beforehand that the rectum was absent in a case of imperforate anus, it would be easiest to perform Amussat's operation, and open the colon in the left lumbar region. But as the absence of the lower part of the rectum, or its distance from the surface cannot be known before operating, the perineal incision is the operation that ought to be chosen. One point in the operation ought especially to be attended to, viz., to bring down the mucous membrane of the gut, and fix it to the lips of the external wound, if it be possible to do so. (Mr. J. Erichsen, p. 234.)

Cancrum Oris.—Apply strong nitric acid freely to the edges of the slough, all around, taking care that the little patient takes a full inspiration previous to the application of the acid, so as to obviate the danger of the vapour getting into the lungs; and repeat the application every day, as long as it may be necessary. Put on a linseed poultice, which should be changed twice a-day; and detach each slough as soon as it can be done. Let the patient have meat diet,

and wine. And give chlorate of potash, fifteen grains and upwards (for children of six or eight years old) daily, in divided doses. (Dr. J. Drew, p. 256.)

Cleft Palate.—In operating for cleft palate it is recommended to introduce the ligatures by means of small curved needles, held with a pair of dressing forceps, upon the inner surface of each blade of which, a small piece of cork, one eighth of an inch thick, has been tied. When this instrument is used, the needle can be held at any required angle, and turned in any direction, thus possessing a great advantage over the *porte-aiguille*. An instrument consisting of a slip of cane, about five inches long, armed at the end with a small cork, is also useful; the operator holding it in his left hand, and receiving upon the cork the points of the needles as they are introduced. (Mr. S. Smith, p. 259.)

Constipation.—In constipation from *paralysis* of the intestinal canal, employ galvanism. Bring the conductor from the positive pole in contact with the tongue, and place that from the negative pole, previously covered with a thin piece of cloth, in the rectum, and pass a current through them for about twenty minutes. The patient may not be able to bear a battery of more than about eight pairs of plates. (Dr. Terzi, p. 87.)

In habitual constipation the use of electro-galvanism will be found of the greatest advantage. It not only acts as an aperient for the time, but gives tone to the muscular and mucous coats of the bowels. Its use is not limited to cases of paralysis, but it will be found serviceable in almost all cases except those arising from organic or mechanical causes. (Dr. W. Cumming, p. 174.)

The best way of giving calomel as a purgative, is to mix it with a little table-salt, and place it dry upon the tongue; it must not be combined with any other purgative, and the patient must abstain for some time from taking water and other fluids. (Dr. J. C. Hall, p. 168.)

Diarrhœa, *Chronic.*—When it resists the usual remedies, give tannic acid, two or three grains twice a day, in the form of pill. (Dr. S. Scott Alison, p. 383.)

Choleroid.—Put the patient into a warm bed; apply over the abdomen a large bran poultice, or a patent epithem moistened with infusion of camomile, and occasionally sprinkled with laudanum; and put hot bottles to the feet. Then give about ℥xv. of rectified oil of turpentine, with a little laudanum or tincture of hyosciamus. One dose sometimes suffices, but if it does not, repeat the medicine. The best way to give turpentine is to put about a drachm of tincture of hop into a wineglass, drop the turpentine into it, and then, *just as the dose is to be taken*, add half an ounce of cold spring water. (Dr. J. J. Trayer, p. 175.)

Infantile.—In *bilious diarrhœa*, with abundant yellow stools, and bilious vomiting, give emetic doses of ipecacuanha, three days in succession. If the ipecacuanha fails, give sulphate of copper every ten minutes,

for three or four doses. In addition, give Rochelle salt, sulphate of magnesia, or magnesia alone, or combined with calomel; for instance, give gr. ss. or gr. j. of calomel at night; and gr. iij. or gr. iv. of magnesia next morning. If the stools are green, the same means are applicable, but especially the saline purgatives, as the tartarized soda; and if the stools remain green, after two or three days, it is well to give gr. iij. or gr. iv. of magnesia, with as much sugar; and at the same time to apply poultices to the abdomen, and give enemata.

In *glairy diarrhœa,* give an enema consisting of gr. j. or gr. iss. of nitrate of silver, in a little distilled water, and when it is returned, follow it immediately by a similar one containing a drop of laudanum. Repeat this method daily, for three or four days. If, in this form of diarrhœa, there is flatulent distension and fever, begin with emetics and Rochelle salts, and then give enemata containing sulphate of copper, or sulphate of zinc, twice the strength of those of nitrate of silver.

In *choleroid diarrhœa,* with rice-like stools and collapse, let the child be held in a mustard-bath, till the hands of the person holding it smart much; then wrap it in woollen cloths, and give a little ether and mint-water. When reaction sets in, give ipecacuanha in emetic doses, and Rochelle salts. If typhoid symptoms come on, and the diarrhœa persists, give enemata of nitrate of silver. Laudanum and astringents are of little or no use in this form of diarrhœa. (M. Trousseau, p. 177.)

Dyspepsia.—In many forms of dyspepsia powdered charcoal is useful, given in doses of a teaspoonful or two before meals, twice or thrice a day. It may be given in the form of pills or lozenges, or made into a paste with water, or spread upon bread. (Dr. Belloc, p. 164.)

Tannic acid is frequently very efficacious, given in doses of one or two grains twice or thrice a day, in water, or any simple vehicle, with a little syrup to cover the unpleasant taste. (Dr. S. Scott Alison, p. 385.)

Flatulent *distension of the Abdomen.*—Small doses of the oil of turpentine are of the greatest value in relieving this symptom, whether arising from mal-assimilation of the food in dyspeptic cases, or accompanying obstruction of the bowels, or following operations for hernia. When it occurs in gouty subjects, a mild course of Cheltenham salines is an excellent auxiliary. (Dr. T. Smith, p. 168.)

Gastralgia.—In many forms of gastralgia the administration of a teaspoonful or two of powdered charcoal (poplar wood the best) before meals, two or three times a day, is very useful. It may be given in the forms of pills or lozenges, or made into a paste with water, or spread upon bread. (Dr. Belloc, p. 164.)

Gums, *Spongy.*—Use a gargle containing three or four grains of tannic acid to the ounce of water. (Dr. S. Scott Alison, p. 384.)

Hæmatemesis.—The natural method by which the bleeding is checked, is the contraction of the stomach. Endeavour, therefore, to produce this contraction; and in accordance with the principle adopted, give the remedies as little diluted as possible, so as not to distend the sto-

mach. Oil of turpentine, which will excite contraction of the stomach, and small doses of gallic acid in the solid form, are most to be relied upon. Let the diet be liquid, concentrated, quite cold, and given in very small quantities at once. Ice is objectionable, as distending the stomach. And blood-letting is only applicable in a few cases. (Dr. J. M. Neligan, p. 427.)

Give oil of turpentine in doses of from twenty to sixty minims every three or four hours. It may be given in simple water, agreeably flavoured, or it may be used in combination with compound infusion of roses, iced water, or solutions of tannic or gallic acid. (Dr. T. Smith, p. 125.)

Hemorrhoids.—When there is no inflammatory action present, apply tannic acid made into an ointment with lard. (Dr. S. Scott Alison, p. 384.)

[The application of collodion is suggested, with a view of exerting compression upon the tumour by the contractile powers of that agent. p. 225.]

Hernia.—A truss is recommended consisting of an elastic steel girdle of proper form, a hard pad of ivory, wood, or metal, hollowed at its back part, and a spiral spring contained in the hollow at the back of the pad, and acting, therefore, directly upon the latter. The form of the pad is oblongo-oval for oblique inguinal hernia, egg-shaped for direct inguinal, and triangular for femoral hernia. (Mr. T. P. Teale, p. 236.)

Strangulated. It is recommended to try the following mode of reducing a strangulated hernia:—Let the thighs be flexed and rotated inwards, and the pillow be taken from under the head. Then let an assistant, standing over the patient, raise him by both legs, so as to lift the trunk from the bed, and throw the whole weight upon the shoulders; the surgeon keeping his hand on the tumour, and gently aiding by taxis the return of the bowel. After this posture has been maintained a short time, let the patient be lowered; and if necessary repeat the process. This method is likely to be applicable chiefly to small and recent herniæ, and to femoral rather than inguinal. Tobacco, the warm bath, or bleeding, are better laid aside: chloroform is a valuable substitute for these, and opium is also to be approved of. (Brit. and For. Reviewer, p. 253.)

The ordinary operation is that which is applicable to a great majority of cases, including all forms of hernia; but Petit's operation may be kept in view as the preferable alternative, when there is no contra-indication. Petit's operation is specially applicable to femoral hernia; and to cases in which the symptoms of strangulation, though acute, have been of short duration, and the hernia is recent, or, if old, has been small and quite reducible. (Brit. and For. Reviewer, p. 252.)

Melœna.—Give oil of turpentine (which by its stimulant properties will excite the intestines to contract, and so mechanically check the bleed-

ing), and small doses of gallic acid in the solid form. And let the diet be liquid, concentrated, cold, and given in very small quantities at a time. (Dr. J. M. Neligan, p. 427.)

ŒSOPHAGUS, *Foreign bodies in the.*—Do not use the probang indiscriminately, to push down everything into the stomach. If the substance impacted be meat, or any such soft, non-irritating and digestible substance, it is proper to use the probang. But all sharp and pointed bodies should be extracted; and the best instrument for the purpose is a whalebone rod, having at one end a piece of watch-spring, which is connected securely to a flat hook, having a hole in the centre for the attachment of some loops of silk which may aid in entangling the foreign body. If the attempt at extraction is not successful, give an emetic of speedy operation, in the hope that the foreign body may be either expelled completely, or so altered in position, that it may now be easily caught hold of. (Mr. J. Adams, p. 254.)

PROLAPSUS ANI.—The disease so called generally depends upon morbid enlargement of the mucous membrane of the bowel. It is easily, safely, and effectually remedied by the use of the ligature; in the application of which it is only necessary to remember that the whole of the diseased growth should be comprehended, and that the threads should be drawn so tightly as completely to arrest all circulation through the included parts. (Prof. Syme, p. 235.)

Employ as an injection, a solution of tannic acid in water, three or four grains to the ounce. (Dr. S. S. Alison, p. 384.)

TEETH, *Loosening of the.*—Use a gargle of tannic acid, three or four grains to the ounce of water. (Dr. S. Scott Alison, p. 384.)

Decayed and Hollow Teeth.—Fill the cavity of the tooth, previously well dried, with collodion, which has been allowed to evaporate to the consistence of a thick paste. (Mr. J. T. Davenport, p. 177.)

A composition of gutta-percha, tar, creasote, and lac, is recommended for plugging hollow teeth. This composition is easily softened by moulding with the fingers, is not at all sticky, and again hardens into any shape in which it has been moulded. (Mr. A. Beardsley, p. 224.)

Bleeding after Extraction of Teeth.—[The composition above described is also recommended for plugging the socket in cases of bleeding after the extraction of teeth. p. 224.]

Toothache.—Apply a bit of cotton saturated with a drop or two of strong tincture of capsicum, (Capsic. bacc. ℥iv.; sp. vin. rect. ℥xij.) (Dr. A. Turnbull, p. 305.)

THROAT, *Relaxed.*—Employ a gargle made with three or four grains of tannin to the ounce of water. (Dr. S. S. Alison, p. 384.)

TONSILS, *Enlarged.*—Do not remove them by the knife in children, as the operation is troublesome, and sometimes serious; and, besides, they often diminish in size spontaneously after puberty. When the patient is old enough to exercise self-control, the operation is safe enough. (Mr. G. M. Humphry, p. 12.)

Vomiting, *Sympathetic.*—Give iodide of potassium in combination with infusion of quassia; a wineglassful of the infusion with three or four grains of the iodide three times a day. (Dr. A. C. Selkirk, p. 169.)

Worms.—*Tapeworm.*—A new remedy is recommended, consisting of the flowers of a Rosaceous plant termed "Kousso". The infusion, with the powdered flowers suspended in it, is taken in the morning, fasting, and lemon-juice is drunk freely before and after the dose. Cases are related in which this medicine was given with efficacy. (Dr. Budd, p. 170.)

Lumbrici.—A combination of assafœtida with calomel, in the form of pills, has succeeded better than anything in expelling lumbrici. The dose of assafœtida is from four grains to half a drachm. The administration of three tablespoonsful of cod-liver oil, at intervals of an hour, has also been followed by the expulsion of lumbrici. (Dr. Cazin, p. 173.)

AFFECTIONS OF THE URINARY ORGANS.

Albuminuria.—Give gallic acid in doses of eight or ten grains every six hours, in some convenient vehicle; not neglecting the use of other remedies to relieve occasional symptoms. (Mr. G. Sampson, Mr. J. Lyell, p. 195; Dr. S. Scott Alison, p. 384.)

Cystitis, *Scrofulous.*—Be particular to rectify any disorder of the digestive organs, and enforce great care as to the diet. Then give, especially if the urine is alkaline, small doses of mineral acids in bitter infusions; or iodide of potassium; or chalybeates. If the disease is obstinate, apply a perpetual blister, or, still better, insert a seton above the pubes, or in the loins. (Mr. G. M. Humphry, p. 15.)

Diabetes.—It is probable that a deficiency of alkali is the reason why the sugar in the blood is not converted in diabetes, as it is in health, into carbonic acid and water. This circumstance, then, gives one indication of treatment, and the emaciation and tendency to phthisis lead to another. In fulfilment of these indications, cod-liver oil and liquor ammonia have been given with advantage; the patient beginning with half an ounce of the oil and five drops of liquor ammonia, thrice daily, and gradually augmenting the dose to five or six times the quantity. (Dr. Bence Jones, p. 189.)

Hæmaturia.—Give oil of turpentine in doses of twenty to sixty minims every three or four hours. It may either be given in water, agreeably flavoured; or added to decoction of uva ursi, chimaphila, or pyrola; or with tincture of muriate of iron. (Dr. T. Smith, p. 125.)

Incontinence of Urine *in Children.*—Examine the urine; and if, as will usually be found, it contains lithic acid, adopt the following treatment. Give hydr. c. cretâ. or some mercurial, till the tongue is clean, and the intestinal secretions are healthy, (for they will generally be found disordered). Then give a little quinine twice a day, before breakfast and before dinner; and give daily, a single large dose of

bicarbonate of potash in copious solution, five hours after dinner. Let the quantity and quality of the diet be also carefully regulated. If these measures are adopted, blistering, &c., will seldom be called for. (Mr. J. Simon, p. 281.)

In Adults.—When it is necessary to wear a portable urinal for the purpose of collecting the urine, it is recommended to employ one made of caoutchouc, which fits on to the end of the penis, and retains itself there by its own elasticity. It is of such a size and form as to cause no inconvenience, and can be emptied by means of a stop-cock, without removing it. (Dr. Gariel, p. 353.)

Hydrocele.—When the iodine injection fails, employ a seton, consisting of one or two threads of dentist's silk. Introduce it by means of a nævus needle, allowing the fluid to drain away through the punctures thus made:—or else tap the hydrocele, pass a needle six inches long, armed with the seton, up the canula, draw it through the upper part of the scrotum, remove the canula and knot the thread. When a sufficient amount of inflammation appears to be set up, remove the seton, and treat the case by rest and antiphlogistic regimen. (Mr. J. Erichsen, p. 278.)

After emptying the sac, introduce through the canula some finely levigated powder of nitric oxide of mercury (quantity not stated). This plan is quite safe and certain, and is much more convenient and speedy than that of injection. (Mr. Lloyd, p. 280.)

Lithotomy, *in Children.*—This operation is not quite so easy as is generally stated, but requires much care and caution. It is necessary to proceed carefully, slowly, and without force, and to recognize the parts with the finger as the operation proceeds. If care is not used, the parts may be pushed before the finger; and this may be suspected when the finger is found to penetrate to a greater depth than three quarters of an inch or an inch. (Mr. W. Fergusson, p. 273.)

Spermatocele.—Injection by tincture of iodine (a teaspoonful of the tincture introduced and allowed to remain), has been found to be both safe and successful. (Prof. Syme, p. 274.)

Injection by tincture of iodine may be practised, and if this is unsuccessful, it will be well to try the following method which has been found successful, viz., after evacuating the fluid, to introduce through the canula a camel-hair brush dipped in tincture of iodine, and to apply it freely to the interior of the serous membrane. (Dr. R. L. Macdonnell, p. 276.)

Stricture of the Urethra.—In obstinate cases of stricture, in which the use of bougies fails to effect any permanent good, the contraction returning as soon as the use of bougies is discontinued, divide the stricture by free external incision from the perineum. Proceed as follows:—The patient being placed in the lithotomy position, and put completely under the influence of chloroform, introduce a grooved director, slightly curved, and small enough to pass readily through the

stricture. (For *there is no such thing as impermeable stricture,*—no stricture through which instruments sufficiently small, and properly managed, cannot pass). Then, while an assistant holds the staff, make an incision an inch or an inch and a half long, in the middle line of the perineum or penis, wherever the stricture is situated; the incision to extend through all the structures external to the urethra. Next taking the handle of the director in the left hand, and a small straight bistoury in the right, with the forefinger guarding the blade, feel for the groove in the director, and push the point into it behind the stricture; run the knife forward so as to divide the whole of the stricture, and withdraw the director. Lastly, pass a No. 7 or 8 silver catheter into the bladder, and retain it there for forty-eight hours. Then take it out, and in eight or ten days pass a moderate-sized bougie, and repeat it once a week or fortnight, for two months. (Prof. Syme, p. 263.)

Since the operation of cutting into the urethra is liable to be attended with fatal results, we are not justified in adopting this plan of treatment for the cases in which Mr. Syme recommends it. Incision is only necessary when no instrument can be passed. Other cases, however obstinate and irritable the stricture may be, can be subdued by the use of potassa fusa. (Mr. H. Smith, p. 269.)

In cases of hard and impervious strictures, irritable strictures, and those which have a marked disposition to contraction, apply potassa fusa, in the following manner:—Having ascertained *accurately* the distance of the stricture from the orifice of the urethra, and marked it on a soft bougie, insert a small piece of potassa fusa (usually one-eighth or one-sixth of a grain) into a hole made in the point of this instrument, and mould the bougie well round the caustic, so as to prevent it from projecting, and so that it may be more applied to the upper than the under part of the stricture. Oil it well, pass it rapidly down to the stricture, and hold it gently, but steadily, against it for one, two, or three minutes. Do not reapply the potash until all irritation arising from the previous application, has ceased; this may be, in irritable stricture, four days, in some old chronic cases, two or three only. (Mr. R. Wade, p. 271.)

AFFECTIONS OF THE SKIN, &c.

Burns and Scalds.—In burns and scalds of the first and second degree, apply solution of nitrate of silver as directed for erysipelas. See "*Erysipelas*". (Mr. Higginbottom, p. 295.)

For the suppurating sores which follow extensive burns, one of the best applications is powdered charcoal. If the burn is on the back, the charcoal may be freely strewed over the bed. (Dr. Newmann, p. 302.)

Contractions from Burns. —When a web of cicatrix exists in the axilla, or between the fingers, or in similar situations, pass a needle carrying a skein of silk through the base or proximal extremity of the web, and allow the silk to remain as a seton. When sufficient inflammation and induration has been excited, the web may be divided in the usual way, with great hope that the contraction will not return. (Mr. W. Fergusson, p. 305.)

CHILBLAINS.—Rub the part well with a sponge or piece of flannel saturated with concentrated tincture of capsicum (capsic. bacc. ℥iv.; sp. vin. rect. ℥xij.), until a strong tingling feeling is produced. Repeat the application daily. (Dr. A. Turnbull, p. 305.)

ECZEMA. —Give acetate of potash in half-drachm doses three times a day. (Dr. J. A. Easton, p. 283.)

ERYSIPELAS.—In very slight cases, an active purgative and low diet will be sufficient, without any local application. But if there are constitutional symptoms, use such constitutional means as bleeding, emetics, purgatives, calomel, and James's powder, and apply nitrate of silver in the following manner:—Wash the part with soap and water, and then with water alone, and dry with a soft cloth; then apply the solution (arg. nit. ℈j.; aq. dest. ʒi.) twice or thrice over the whole inflamed surface, and on the healthy skin around it to the extent of two or three inches. In twelve hours examine the part, and if any spot of inflamed surface is unaffected by the nitrate of silver, apply it again. If the inflammation spreads, repeat the application. If there are vesicles break them, and apply the solution over the denuded part; but do not disturb the vesications caused by the nitrate of silver itself. When erysipelas is spreading to the scalp, shave the head as early as possible, and apply the solution freely all over the scalp. Nitrate of silver may be applied in any period of the disease; and it never causes metastasis. (Mr. J. Higginbottom, p. 295.)

Apply collodion, all over the inflamed surface, daily. It may be safely applied to the head and face. (Dr. J. Snow, p. 297.)

Phlegmonous.—Apply a number of leeches to the inflamed part, or make small incisions with a lancet; put on a bread-and-water poultice until the bleeding has ceased, and then apply the solution of nitrate of silver (℈i. to ʒi.) freely upon and beyond the inflamed parts. If suppuration is expected, cover it with a plaster of neutral ointment (a modification of ung. plumbi. co.), but if not, expose the parts to the air to form an eschar. The constitutional treatment will be ipecacuanha emetics, saline purgatives, and repeated doses of calomel with James's powder. (Mr. J. Higginbottom, p. 296.)

HERPES ZOSTER.—[For the treatment of the distressing neuralgic pains which often accompany herpes zoster, see "*Neuralgia*".]

LEPRA.—Give acetate of potash, in doses of half-a-drachm three times a-day. (Dr. J. A. Easton, p. 283.)

Give phosphorus, or apply it externally. See "*Psoriasis*" (Dr. T. H. Burgess, p. 289.)

Lupus.—Give phosphorus, in the form of phosphorated oil or ether, mixed up with powdered gum and mint water; or apply it externally, in the form of ointment made with camphorated lard. (Dr. T. H. Burgess, p. 289.)

Nævus.—Apply a drop of strong fuming nitric acid, by means of a glass rod, and let it dry on. If the nævus is very small, not even a scar will be left. (Dr. Keber, p. 303.)

Apply collodion, which by its contractile power will exert pressure upon the tumour. (Dr. Brainard, p. 225.)

Pass a flat platinum needle, heated to whiteness, through the substance of the nævus. (M. Lenoir, p. 303.)

Porrigo.—[An apparatus for the purpose of fumigating the scalp in this and other diseases, is described by Dr. T. H. Burgess, p. 301.]

Psoriasis.—Give acetate of potash in doses of half-a-drachm three times a-day. It acts (as described by Dr. Golding Bird) by increasing the metamorphosis of tissue in the system, by which means all products of low vitality are likely to become decomposed and eliminated from the system in the urine. (Dr. J. A. Easton, p. 283.)

Phosphorus is most valuable, either for internal exhibition (in the form of phosphorated oil or ether, mixed up with powdered gum acacia and mint-water), or for external application, in the form of ointment made with camphorated lard. (Dr. T. H. Burgess, p. 289.)

Scabies.—Smear the parts with lard, night and morning, and cover them with oil-silk. When the hands and wrists are the parts affected, they can be enveloped in oil-silk bags. (Prof. Bennett, p. 299.)

Small-Pox, *To prevent pitting from.*—Apply mercurial ointment thickened with starch, (ung. hydrarg. ℥i; pulv. amyli. ʒ ij.) to the forehead and face, night and morning. The ointment forms a thick hard crust, which, as it cracks and peels off, is renewed by a fresh application. (Prof. Bennett, p. 303.)

Ulcers, *Callous.*—Apply strips of adhesive plaster above and below the sore, and across its middle; strew powdered charcoal freely in the intervals, apply ointment spread on lint, and bandage. Renew this every two or three days. The patient need not be confined to bed. (Dr. Newmann, p. 303.)

[The treatment of various kinds of ulcers by means of nitrate of silver is recommended; but as the details are rather minute and complicated, the reader is referred to the original article by Mr. J. Higginbottom, p. 289.]

Wounds.—[The application of nitrate of silver is also recommended in the treatment of almost every kind of wound,—incised, punctured, contused, lacerated, and dissection wounds. Upon this subject, as on that of ulcers, we must refer the reader to the paper by Mr. J. Higginbottom, p. 289.]

AFFECTIONS OF THE BONES AND JOINTS, &c.

FRACTURE *of the Leg.*—In many cases of fracture of the leg, where there is such a degree of spasm as to cause great difficulty in the treatment, the tendo-Achillis may be divided. (Mr. C. De Morgan, p. 217.)

Of the Ribs.—Do not bleed, nor apply a bandage, but give opium freely, and keep the patient at rest. (Mr. Hancock, p. 217.)

Of the Clavicle.—[A new apparatus for the treatment of fracture of the clavicle is described by Dr. J. B. Coleman, p. 216.]

GANGRENE.—The first point is to distinguish between constitutional and local mortification. When gangrene is threatened in cases of injury to the main artery of a limb, it may sometimes be prevented by keeping up gentle but continual friction by the hands of assistants upon the lower part of the extremity. In the case of gangrene occurring in the foot after such an injury, a line of demarcation should not be waited for, but the limb should be amputated immediately, below the knee. (Mr. G. J. Guthrie, p. 389.)

Senile.—Give purgatives, and employ antiphlogistic regimen; and apply nitrate of silver at an early period. The parts being moistened with water, and any vesicated cuticle removed, apply the solid nitrate freely on the affected toes, and lightly on the surrounding healthy skin. (Mr. J. Higginbottom, p. 297.)

JOINTS, *Scrofulous disease of.*—Secure rest of the joint by plasters, leather or gutta-percha splints, and bandages; but confine the patient to the house no more than is absolutely necessary, or the health will be injured, and the local disease thereby aggravated. Apply tincture or ointment of iodine, night and morning, so as just slightly to irritate the skin; and alternate its use with other stimulating liniments, blisters, or, in slight cases, the cold douche. When abscesses form, allow them to burst spontaneously. (Mr. G. M. Humphry, p. 16.)

TOE-NAIL, *Ingrowing of the.*—In order to heal the troublesome ulcer arising from this cause, separate the soft parts from the nail so as to expose the whole surface of the ulcer, and sprinkle it freely with powdered charcoal, mixed with a little acetate of lead or oxide of zinc; bind a piece of lint over it, and let the patient wear a wide shoe, and keep quiet. Every day bathe the toe with tepid water, and sprinkle fresh charcoal over it, without disturbing that previously applied. (Dr. Newmann, p. 302.)

A case is related in which the distress arose from a hardened mass of epidermic scales, the size of a sweet pea, placed beneath the nail. On removing this, relief was immediately obtained, and a cure speedily effected. (Mr. J. M'Dougal, p. 421.)

VENEREAL AFFECTIONS.

Bubo, *Non-virulent.*—If suppuration appears imminent, apply fomentations and poultices; otherwise, apply leeches and evaporating lotions. If, while suppuration is prevented, a permanent indurated condition of the swelling remains, this may result from a strumous habit, and, if so, will yield readily to the exhibition of iodine and iodide of potassium, and proper dietetic management.

Virulent.—Give mercury cautiously, sometimes with iodide of potassium, and do not use any local application which would conceal the characteristic appearances of the ulcerated sore. When the mercury produces the desired effect on the constitution, the ulcerated surface will become healthy, and the characteristic hardness disappear. And until the induration has completely disappeared, the mercury should be perseveringly continued. (Mr. B. Cooper, p. 313.)

Chancre, *Simple.*—When called to see a venereal sore, of only three or four days' duration, apply concentrated nitric acid. But if a sore has all the appearances of true chancre, begin by using constitutional treatment,—giving five grains of blue pill and a quarter of a grain of opium night and morning. So long as the patient is taking mercury, apply no local remedy whatever, and then the sore will furnish, by its appearance, the best possible indication of the effect which the medicine is producing.

Irritable.—Apply nitrate of silver to the sore, and give repeated doses of opium. If when the irritability is subdued, induration remains, give mercury, as in a simple case. In some instances of irritable chancre, calomel and opium will answer as well or better than opium alone.

Phagedenic.—First evacuate the bowels, and then give repeated doses of opium, and apply soothing fomentations. If the vital powers are depressed, give bark, ammonia, and even wine; but if there is a plethoric condition, adopt antiphlogistic measures. If the progress of the ulceration is not checked, apply concentrated nitric acid.

Gangrenous.—Keep the patient in the recumbent posture, and after evacuating the bowels, give ammonia, bark, or serpentary, with wine or porter; and apply black wash, nitric acid lotion, stale beer grounds, or stimulating poultices. (Mr. B. Cooper, pp. 311-12.)

When the healing of chancres on the penis is interfered with by the occurrence of erections, give five or ten grains of lupulin at bedtime, and repeat it if necessary. (Dr. Page, p. 419.)

Condylomata. Those condylomatous growths arising about the perineum, scrotum, and anus, in old cases of gonorrhœa, may generally be cured by the application of yellow wash. (Mr. B. Cooper, p. 314.)

Gonorrhœa.—Begin by giving purgatives, and nauseating doses of tartarized antimony, and when the inflammatory symptoms are relieved, give the following mixture:—℞. Bals. copaib. ℥ss.; pulv. cubebæ. ℥ss.; liq. potassæ, ʒiss.; mucilag. acaciæ, ℥ss.; aq. destil. ℥viss.; M.

Two tablespoonsful to be taken twice a day, as at eleven and three o'clock, but not upon an empty stomach. When the inflammation is severe, employ emollient injections into the urethra; also sedative injections, such as liq. plumbi. diacet. ♏xx. in ℥iss. of water. In mild cases, and in constitutions that are not irritable, stimulating injections may be used, such as hyd. bichlor. gr. i. in ℥viij. of water. (Mr. B. Cooper, p. 314.)

The occurrence of that very unpleasant attendant upon the acute stage of gonorrhœa, chordee, may be completely prevented by giving lupulin. The same remedy is successful in relieving that pain in the perineum which often occurs in chronic gonorrhœa. It is given in doses of from five to ten grains at bedtime, in the form of pill or powder, and repeated if necessary. (Dr. Page, p. 419.)

When the inflammatory symptoms have subsided, gallic acid may be given, in doses of twelve grains, five times in the twenty-four hours. (Mr. Sampson, p. 195.)

When the inflammatory stage has passed, apply, externally, a lotion containing three or four grains of tannin, to the ounce of water. (Dr. S. Scott Alison, p. 384.)

Warts.—If they are pedunculated, employ the ligature; in other cases, apply caustic, or powdered savine. If these means are insufficient, excise the warts with the knife, and apply caustic to the cut surfaces. When there is phymosis with warts, the prepuce must always be laid open immediately. (Mr. B. Cooper, p. 314.)

AFFECTIONS OF THE EAR.

Eustachian Tube, *Obstruction of the.*—To ascertain the condition of the eustachian tube, it is recommended to use an instrument resembling a flexible stethoscope, one end of which covers the auricle of the patient, while the other is received into the ear of the surgeon. When the instrument is applied, the patient is to make a forced expiration; and by the sound produced, the surgeon judges of the patency or obstruction of the canal. (Mr. Harvey, p. 315.)

[An instrument similar to the one above described, except that the end of the tube is inserted into the external meatus of the patient, instead of surrounding the meatus, is recommended for the same purpose by Mr. J. Toynbee, p. 316.]

Meatus Auditorius, *Foreign Bodies in the.* Do not attempt their extraction by forceps or director, but use a syringe large enough to hold two or three ounces of water. If such a syringe is used, and the water injected with considerable force, the foreign body may always be removed from the meatus, and that without risk of injuring the wall of the canal or the membrana tympani. (Mr. J. Toynbee, p. 317.)

MIDWIFERY AND DISEASES OF WOMEN.

Abortion.—After abortion has taken place, and especially if with a large loss of blood, the administration of a starch enema containing opium, every night or oftener, has the best effect in allaying excitement and tranquillizing the circulation. (Dr. J. C. Lever, p. 356.)

In a case of abortion at the sixth week, the administration of chloroform has been successful in causing dilatation of the os uteri. (Mr. I. B. Brown, p. 428.)

In abortion during the early months, the ovum can always be got away by giving a stimulating enema, such as turpentine. (Dr. Tyler Smith, p. 429.)

Habitual. — When there is no local or general plethora, but the disposition to abort depends upon weakness of the uterine system, give savine; an infusion being made of two to four drachms to six ounces of boiling water, give a tablespoonful morning and afternoon, in the intervals between the menstrual periods; rest of the uterine and general system, and regulation of the diet, being also enjoined. If, in addition to the uterine weakness, there is augmented irritability and contractility, give ergot of rye in conjunction with the savine. (Dr. Metsch, p. 360.)

In cases of habitual abortion, occurring in women of weak and irritable fibre, and without vascular congestion, the administration of assafœtida as soon as pregnancy occurred, has been very beneficial. (Brit. and For. Reviewer, p. 361.)

Dysmenorrhœa.—The inhalation of chloroform is a valuable means of relieving the pain. The chloroform should be inhaled at bedtime, and then, if the patient remains perfectly quiet on recovering consciousness, she will have a good night's rest. (Dr. J. Henry Bennet, p. 372.)

Labour, *Use of Chloroform in.*—The careful inhalation of chloroform is quite innocuous. It may therefore be given in *natural labour*, simply for the purpose of allaying pain, *if the patient requests it.* And it ought to be given when the regularity and efficiency of the pains are interfered with by emotion, nervous excitement, or cerebral congestion. In all such cases the inhalation must only be carried to the extent of allaying pain,—not to make the patient unconscious. In *operative* midwifery, chloroform should be given in difficult cases of turning, and of retained placenta; and the full surgical effect, of unconsciousness and muscular relaxation, should be produced. In forceps and craniotomy cases chloroform should not be used. (Dr. J. Henry Bennet, p. 370.)

Chloroform may be given safely and with propriety in natural labour for the purpose of subduing the pain, which may be accomplished without taking away the patient's consciousness, or causing the least interruption to the action of the uterus. In operative midwifery, enough should be given to produce unconsciousness. It

is absolutely necessary, however, to ensure success and safety, that the chloroform should be pure, and that close attention should be paid to the symptoms which the inhalation produces. It is advisable also to use an inhaler, that of Dr. Snow being one of the best. (Dr. Murphy, p. 375.)

Chloroform ought never to be used either in natural or in instrumental labour. The only cases which can *justify* its employment are:—1. where there is extreme nervous excitability; 2. where there are severe muscular pains in the the neighbourhood of the uterus, interfering with its action; and 3. in very difficult cases of turning. And in the two former cases chloroform, if used at all, should be given to such an extent as to diminish sensation, not to produce insensibility. (Dr. Waller, p. 378.)

Leucorrhœa.—Give tannic acid, two or three grains twice a-day, dissolved in water, with a small quantity of dilute nitric acid. (Dr. S. Scott Alison, p. 384.)

Menorrhagia.—Give two or three grains of tannin, dissolved in water, together with a small dose of dilute nitric acid, twice a-day. (Dr. S. S. Alison, p. 384.)

In extreme cases, when it is necessary to plug the vagina, use a little caoutchouc bladder, which can be introduced into the vagina, and then inflated by means of a long tube attached to it, so as to exercise the necessary amount of compression. (Dr. Gariel; M. Diday; p. 352.)

Nipples, *Sore.*—Apply lycopodium powder mixed with a little oxide of zinc. It must be powdered well over the part after every time the child sucks. (Dr. Newmann, p. 302.)

Ovarian Disease.—A new operation is recommended, which is thus performed:—Make an incision about three inches long in the direction of a line drawn from the umbilicus to the anterior superior spine of the ilium, and dissect carefully down to the peritoneum. Make a second incision about one and a half inch long, at right angles to the first, and again dissect down to the peritoneum. Introduce a trocar at the point of the angle, and draw off the fluid. Then divide the peritoneum, and reflect it back; stitch the cyst to the tendon of the external oblique, so carefully as to prevent any escape of fluid into the peritoneal cavity; withdraw the canula, and make a larger opening into the cyst with scissors; lastly, introduce a pledget of lint soaked in oil, and apply adhesive straps round the abdomen to keep up gentle pressure. (Mr. I. B. Brown, p. 352.)

Polypus Uteri, *Intra-uterine.*—When the symptoms afford reason to suspect the existence of a polypus concealed within the uterus, the diagnosis may be rendered certain by the dilatation of the os and cervix uteri, by means of sponge-tents. The tents recommended are of a conical form, and are introduced by the aid of a director resembling the uterine sound. Usually a single tent, applied for twenty or thirty hours, opens the os and cavity of the cervix sufficiently to allow an

examination of this part by the finger. In order to examine the cavity of the body of the uterus, it is necessary to employ a series of tents for several days, taking care to pass them within the os internum. When the presence of a polypus is ascertained, if it be gradually but certainly making its way downwards, and the hemorrhage and other symptoms are not urgent, wait for its descent through the os, before attempting its removal; facilitating its passage by the dilatation of the os and cervix with sponge-tents, and by the internal use of ergot. But if there is too much hemorrhage to wait, or if there is no likelihood of the tumour's descent, proceed forthwith to remove it. With this object, first dilate the os uteri further; then if the polypus is large, divide the pedicle with very curved blunt-pointed scissors, or with a silver wire passed round it and tightened by means of a screw; or if these means are inapplicable, contuse and crush the tumour by a pair of lithotomy forceps, or similar instrument. Or, if the polypi are small and vesicular, (in which case they are generally numerous, and situated in the cavity of the cervix), remove those that are fully formed and pediculated, by the scissors, or by scratching them off with the nail; and destroy those that are not completely developed, but are imbedded like peas in the mucous membrane of the cervix, by the application of potassa fusa. (Prof. Simpson, p. 320, &c.)

Premature Labour.—The following method proposed by Kirnsch and Cohen, has been successful in inducing premature labour:—Pass the nozzle of a large syringe, containing 11 or 12 oz. of water, at 92° F., half an inch within the cervix, and inject the water with some degree of force for a number of times (*e. g.* eight or ten, up to seventeen times); and repeat this process twice a-day until labour is induced. (Dr. O. Naegele, p. 360.)

Prolapsus Uteri.—A good supporter is obtained by a modification of the T bandage, in which the perineal straps cross each other, and fasten on the opposite side to that from which they spring. Sometimes a pad may be interposed between the perineum and the straps. (Dr. Blundell; Mr. T. W. Nunn; p. 354.)

[A new kind of supporter is also described by Mr. P. Mageniss, p. 355.]

Puerperal Convulsions, *Anæmic.*—While stimulants are given, and the contraction of the uterus is secured, give opium, which will act like a charm.

Hysterical.—In this form of convulsions, which occurs chiefly during pregnancy, great benefit will result from the administration of a mild opiate as soon as the paroxysm is over. (Dr. J. C. W. Lever, p. 358.)

Retained Placenta.—When it is necessary to extract the placenta, give chloroform, to the extent of producing unconsciousness and muscular relaxation, (Dr. J. Henry Bennet, p. 371.)

Rupture *of the Uterus.*—Give full doses of opium at intervals for several days. A case so treated has recovered, though the rupture was so extensive that the hand could be passed into the cavity of the abdomen. (Dr. J. C. Lever, p. 359.)

TURNING.—In cases where there is any difficulty, the process is much facilitated by giving chloroform. It should be given to the full surgical extent, so as to produce unconsciousness and muscular relaxation. (Dr. J. Henry Bennet, p. 371.)

VAGINA, *Plugging the.*—The vagina may be easily and efficiently plugged by means of a little bladder of caoutchouc, of suitable form, introduced in a collapsed state, and then inflated by means of a long tube attached to it. (Dr. Gariel, p. 352.)

VULVA, *Prurigo of the.*—In severe cases of prurigo of the vulva, vagina, or cervix uteri, brush the affected parts over with hydrocyanic acid, the strength of that of the Edinburgh Pharmacopœia. (Dr. Simpson; Dr. Pattison; p. 337.)

MISCELLANEA.

ADHESIVE PLASTER.—An excellent adhesive plaster, unirritating to the skin, not acted on by water, or the discharges from the wound, and possessing all the good properties of collodion except its want of colour, with the additional advantage of being cheaper, is made by dissolving, with the aid of a moderate heat, gum lac in spirit of wine, in sufficient quantity to make it of the consistence of jelly. It can be kept in a wide-mouthed bottle, and spread with a spatula as required. (Dr. Mellez, p. 422.)

CAUSTICS, *New.*—For cauterizing the uterus, employ cylinders of potassa-cum-calce, made with two parts of potassa to one of lime fused together and run into iron moulds. While this preparation is quite as powerful as pure potassa, it may be used with much greater ease and safety, as it does not deliquesce like the latter. (Dr. J. Henry Bennet, p. 345.)

For the purpose of cauterizing cancerous tumours, &c., use a preparation made by gradually dropping a certain quantity of highly concentrated nitric acid upon lint, until a gelatinous paste is formed. A portion of this paste is to be applied upon the part until an eschar is formed. (Dr. Rivallié, p. 10.)

CHLOROFORM.—A good sign of the production of insensibility is, a kind of trismus which affects the elevator muscles of the jaw, so that the teeth are pretty firmly pressed together. (M. Dudart, p. 429.)

COLLODION.—Collodion, prepared in the following manner, is better adapted for some purposes than that made in the ordinary way:—Mix 4 lbs. of nitrate of potash with 8 lbs. of sulphuric acid in a glazed vessel, add the cotton, and agitate for half an hour with a glass rod; then wash and dry the cotton very carefully. Dissolve 1 oz. of this cotton in 16 fluid ounces of rectified sulphuric ether, and when dissolved, add 1 oz. of absolute alcohol. When the solution has stood twenty-four hours, it will be ready for use. A little of this collodion, allowed to evaporate till it becomes of the consistence of thick paste, answers well for stopping teeth. (Mr. J. T. Davenport, p. 422.)

Lint.—A preparation termed "black lint" is recommended as an application to various kinds of ulcers, &c. It is prepared by saturating an ounce of fine lint in a solution of ʒ ij. of nitrate of silver to ℥ iv. of distilled water, and exposing the lint to dry, by evaporation, in a flat, shallow vessel. (Mr. J. Higginbottom, p. 294.)

[An improved kind of lint, named "golden flax lint", is described with great commendation at p. 421.]

Pessaries.—A new form of pessary is recommended, consisting of a bladder of caoutchouc which is introduced into the vagina, and then inflated to the proper degree. (Dr. Gariel, p. 423.)

Semola.—[A new preparation of wheat flour, containing between fifty and sixty per cent. of gluten, together with pure wheat starch, and forming a highly agreeable, digestible, and nutritious kind of food, suitable to cases where unstimulating, but at the same time highly nutritive diet, is required; suitable also, it is probable, to the special case of diabetes,—is described under this name by Mr. Lloyd Bullock, p. 413.]

Vaccination.—Make at least six punctures, each produced by carrying the point of a lancet, held flat to the arm, obliquely downwards through the cuticle into the surface of the cutis. If possible, use fresh lymph; and never take lymph from a vesicle after the eighth day. Let the instrument used to apply the lymph remain inserted a few seconds, and then be wiped upon the orifice of the puncture. Lastly, if the development of the vesicles is not satisfactory, or if there is only one vesicle, use Bryce's test to try the efficacy of the vaccination. It consists in inserting fresh lymph on the evening of the fifth, or morning of the sixth day; then, if the second vesicles progress rapidly and overtake the first, it will show that the vaccination has been successful. (Dr. W. S. Oke, p. 25.)

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